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Satellite-based vessel monitoring systems International legal aspects & developments in state practice

Ben M. Tsamenyi

University of Wollongong, tsamenyi@uow.edu.au

Erik Jaap Molenaar

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**SATELLITE-BASED VESSEL
MONITORING SYSTEMS
INTERNATIONAL LEGAL ASPECTS
& DEVELOPMENTS IN STATE
PRACTICE**

by

Erik Jaap Molenaar & Martin Tsamenyi

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**SATELLITE-BASED VESSEL MONITORING SYSTEMS (VMSs)
FOR FISHERIES MANAGEMENT
International Legal Aspects and Developments in State Practice**

Erik Jaap Molenaar and Martin Tsamenyi¹

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1 Introduction

The conservation and management of marine living resources has been fraught with problems since decades and nothing indicates that this is likely to change in the near future. To set hopes high would also be unrealistic due to the fundamental characteristics of marine fish, namely that they are a common property and renewable natural resource incapable of being spatially confined.² The 1998 United Nations General Assembly Report “Oceans and

¹ E.J. Molenaar is Research Associate at the Netherlands Institute for the Law of the Sea (NILOS), Utrecht University and is currently stationed at the Centre for Maritime Policy, University of Wollongong, Australia. M. Tsamenyi is Director of the Centre for Maritime Policy. Dr. Molenaar’s involvement in the issue of satellite-based VMSs commenced with a request by the Commission of the European Community (EC; in Mauritius) to prepare a presentation for a meeting of the Indian Ocean Commission, held in Mauritius, February 1999. Professor Tsamenyi has been actively involved in satellite-based VMSs in his position as Fisheries Law Adviser to the South Pacific Forum Fisheries Agency (FFA); a position he held until June 1999. The authors are grateful for the comments by D.H. Anderson, A. Bedford, W. Heere, H. Koster, R. Lagoni, A. Oude Elferink, R. Rayfuse and J. Verborgh on an earlier version of this article.

² Cf. R.R. Churchill, *EEC Fisheries Law*, Dordrecht/Boston, Lancaster, Martinus Nijhoff Publishers, 1987, p.

the law of the sea. Report of the Secretary-General” identifies as key factors responsible for the current global overexploitation and economically inefficient fisheries:

the lack of political will to make difficult adjustments, particularly in respect of access to fishery resources and fishing rights, persistence of direct and indirect subsidies, lack of control of fishing fleets by flag States, resistance of the fishing industry to changes, lack of participation of traditional fishing communities in the decision-making process and continued use of destructive fishing practices.³

This enumeration is by no means exhaustive and a range of more specific defects could be mentioned as well. This article does not single out one of these factors, although the core issues all relate to the lack of flag State control. Rather than focussing on efforts aimed at strengthening flag State control directly, the focus will be on one particular tool: satellite-based vessel monitoring systems (VMSs), and its use in fisheries management.⁴ However, as will be clarified, it would be incorrect to regard this tool exclusively from the perspective of enforcement.

The purpose of this article is to analyze a State’s rights and obligations under international law with respect to satellite-based VMSs for fisheries management. Appropriate account will be paid to relevant provisions in global instruments relating to marine fisheries management, *viz.* the United Nations Convention on the Law of the Sea (LOSC),⁵ Chapter 17 of Agenda 21⁶, the 1993 FAO Compliance Agreement,⁷ the 1995 Fish Stocks Agreement,⁸ and the 1995 FAO Code of Conduct⁹ and its Technical Guidelines.¹⁰ The article begins by explaining the operational aspects of satellite-based VMSs in Section 2 and its place in fisheries management in Section 3. Section 4 is devoted to the relationship between satellite-based VMSs and the law of the sea, which forms the brunt of the legal analysis, and Section 5 briefly discusses aspects of space law. After Section 6 devotes attention to developments in State practice, Section 7 formulates concluding remarks.

3, who identifies four consequences for the regulation of marine fisheries: (1) a tendency for fish stocks to be fished above biologically optimum levels; (2) a tendency for more fishermen to engage in a fishery than is economically justified; (3) a likelihood of competition and conflict between different groups of fishermen; and (4) the necessity for any regulation of marine fisheries to have a substantial international component.

³ UN Doc. A/53/456, para. 261.

⁴ Improving flag State performance in high seas fisheries is the main objective of the 1993 Compliance Agreement (see *infra*). For definitions of flag, port and coastal States, see Section 4.1.

⁵ Montego Bay, 10 December 1982. In force 16 November 1994, XX *International Legal Materials* 1245 (1982). As at 1 January 2000, 132 States and the EC were Parties to the LOSC.

⁶ Agenda 21, Annex II to the Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3 to 14 June 1992. A/CONF.151/26. Particularly relevant are paras. 17.44-17.96.

⁷ Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas, Rome, 24 November 1993. Not in force, 33 *International Legal Materials* 969 (1994). As at October 1999, 14 acceptancies were received (25 needed).

⁸ Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, New York, 4 August 1995. Not in force, *Law of the Sea Bulletin* No. 29 (1995), p. 25. As at 1 January 2000 there were 25 States Parties (30 needed).

⁹ Code of Conduct for Responsible Fisheries, Rome, 31 October 1995. <http://www.fao.org/WAICENT/FAOINFO/FISHERY/fishery.htm> (FAO Fisheries Department’s website). According to FAO Conference Resolution 15/93, para. (3) the 1993 FAO Compliance Agreement forms an integral part of the 1995 FAO Code of Conduct.

¹⁰ Technical Guidelines in Support of the Implementation of the Code of Conduct on Responsible Fisheries. So far, the FAO Fisheries Department has published the following Technical Guidelines: No. 1: Fishing Operations; No. 2: Precautionary Approach to Capture Fisheries and Species Introductions; No. 3: Integration of Fisheries into Coastal Area Management; No. 4: Fisheries Management; No. 5: Aquaculture Development; and No. 6: Inland Fisheries (all available on the FAO Fisheries Department’s website). Other Technical Guidelines are still under preparation. Particularly relevant here is: *Fishing Operations. 1. Vessel Monitoring Systems* (Rome, FAO, 1998), which is Supplement No. 1 to the Technical Guidelines No. 1 (further referred to as FAO VMS Guidelines).

2 Satellite-based VMSs: How it works

In laymen terms, a satellite-based VMS involves the monitoring of vessels within certain areas for the purpose of, *inter alia*, ascertaining the vessels' location and/or the type of activity in which they are engaged. In the context of this article, this activity will of course be fishing. Conventional types of VMSs do not rely on satellites but on vessel movement reports by radio, aerial or surface surveillance, land based radar, sea based sonar, observer programs or incidental reports by other (fishing) vessels or airplanes.¹¹

A preliminary distinction which has to be made is that between vessels that have or have not installed so-called 'automatic location communicators' (ALCs).¹² This equipment is capable of automatically transmitting a signal with position and other information, to a satellite or another type of receiving station.¹³ Currently, the main satellite systems which can be used for this purpose in addition to a variety of other purposes various are Inmarsat and Argos.¹⁴

With the installment of ALCs, it will first of all be easy to determine the location of (identified) vessels at any given time or, in addition to that, all other information transmitted by the signal. It is of course not possible to verify whether vessels that have not installed such equipment are engaging in illegal activities. This is possible through what is, for the purpose of this article, called 'Satellite Remote Sensing' (SRS). SRS involves the use of satellites for the collection of all kinds of data relating to the earth's surface and even subsurface conditions. Currently, there are only two satellites using Synthetic Aperture Radar (SAR) technology, *viz.* RadarSat-1 and ERS-2, which are capable of not only locating a vessel, but also of ascertaining with some degree of certainty that a vessel is engaged in fishing.¹⁵ A possible alternative for the rather expensive SRS is the use of Over the Horizon Radar (OHR)¹⁶ or enhanced radar capability on airplanes.

With respect to vessels equipped with ALCs, information will, at certain intervals, be automatically transmitted to a satellite before ultimately ending up at a fishery monitoring centre (FMC). Here it can be checked if a fishing vessel is allowed to fish in the area where it is located and how long it stays there. Based on the vessel's speed and navigation

¹¹ Certain States, for instance Mozambique, have adopted a system of 'self-surveillance' under which licensed fishing vessels are required to report on (alleged) illegal fishing activities (noted in FAO Doc. GCP/INT/606/NOR, *Report of a Regional Workshop on Fisheries Monitoring, Control and Surveillance (Albion, Mauritius, 16-20 December 1996)*, Rome, FAO, 1997, at p. 10). This imposes therefore an obligation on those who would already have an incentive to oppose free riders.

¹² These are transmitters or transceivers integrated with Global Positioning System (GPS) and an automated reporting system (*cf.* FAO VMS Guidelines, p. 8). Terminology used instead of ALCs includes: Vessel Location Device (VLD; used by FAO VMS Guidelines) and 'vessel tracking device' (EC Commission Regulation No 1489/97, of 29 July 1997, *Official Journal* 1997, L 202/18). See also the developments on automatic identification systems (AIS) within the International Maritime Organization (IMO) in Section 4.2.

¹³ For example by radio (VHF).

¹⁴ Quite recently, Argos became also capable of two-way communications. Inmarsat is operated by the International Maritime Satellite Organization. A variety of regional systems exist as well, for example Euteltracs and Boatracs in Europe and the United States respectively. Eutelsat stands for the European Telecommunications Satellite Organization (J. Fitzpatrick, *Satellite Data Communication Systems, Remote Sensing and Other Techniques as an Aid to Monitoring, Control, Surveillance and Enforcement*, in: '1996 Mauritius Workshop', *supra* note 11, at pp. 131-132).

¹⁵ In their current application, however, these systems still have many deficiencies. For example, accuracy is affected by the vessel's speed and size, and sea surface conditions, it is relatively expensive and the revisit time of the satellite could be considerable. This is not to say that in certain situations it could already be used as an addition to tracking ships equipped with ALCs. Other relevant satellites include Envisat (launch in 1999) and Palsar (launch in 2002) (information based on F. Jansen, *Satellite Surveillance in Support of Sustainable Fisheries Management*, unpublished paper, 1999; Fitzpatrick 1997, *supra* note 14, at p. 132; and FAO VMS Guidelines, pp. 9-10).

¹⁶ As suggested by R.G. Lovingfoss at the International Conference on Satellite Technology in Fisheries, Cairns, Queensland (15-18 August 1999). Moreover, cellular phone technology may soon be capable of providing store-and-forward position reporting in littoral areas (G. Hitchen and S. Yin, *VMS – A U.S. Perspective*, unpublished paper presented at the 1999 Cairns Conference (this note *supra*), Section 4.1).

patterns, which reveal a so-called 'fishing signature', it can even be determined if it is engaged in fishing. This can even be used for multiple-license (multiple-species) fishing as most types of fishing have a more or less unique fishing signature. ALCs can, to some extent, also be remotely controlled by 'polling', for example by changing the duration between vessel position reports if analysis indicates that a vessel should be more or less closely monitored. The polling function can be carried out by 'decision engines' which are also capable of automatically generating recommendations on the necessary steps of enforcement.

In addition to transmitting identification and location data, the technology is already, or will soon be, available to transmit a wide range of other voluntarily provided information (such as catch reports) or automatically generated evidence that a vessel is engaged in fishing. On-board sensors could, for example, indicate not only the vessel's speed and direction but also information on the operation of the engine(s) or the hydraulic boom used for the fishing gear.¹⁷ Sensors could also be used to transmit information valuable to fisheries management, for example sea temperature and salinity.¹⁸ The possibility of integrating all this information with data obtained by other means (SRS, sea depth, catch reports/statistics) can create a powerful tool in enhancing not only compliance but fisheries management in a broad sense. Insight in the spatial distribution of biomass, both overall and near real-time, facilitates tailored management measures and deters illegal behavior.

Information on a vessel's identity and location, or even whether it is engaged in fishing or not, is of great value when linked to certain management measures, such as closed areas or seasons (in general or for specific ships), 'exclusion zones',¹⁹ or restricted fishing effort through fixed fishing days. In the absence of such management measures, the main objective is limited to verification of catch-reporting requirements. Collected data are then checked with the vessel's logbook in which entries should be made of all catches and their location, and/or tracking and logbook information of other vessels operating simultaneously in the same area.²⁰

A satellite-based VMS which is only capable of monitoring vessels equipped with ALCs, obviously has an inherently limited scope of application. SRS or OHR could therefore be used to locate vessels that have not installed ALCs or that tamper with them and, based on speed and navigation patterns, ascertain if the vessel is engaged in fishing. As such systems are unable to assess a vessel's identification, it will subsequently be necessary to contact and identify the potential offender by aircraft or patrol boats. Aircraft will confront the operator/owner of the ship with the offense, take photographs which can be used as proof in further enforcement steps, or give other directions. Patrol boats will intercept the alleged offender and take appropriate enforcement measures.

Interception and/or photographs will, in many cases, also be necessary in relation to vessels equipped with ALCs. This will be the only way to order or bring the vessel into port. In addition, the judiciary may not accept the transmitted information as sufficient evidence to establish that a violation has taken place.²¹ There are several factors that should be taken into account when assessing the cost-effectiveness of the most optimal mix of forms of

¹⁷ See Fitzpatrick 1997, *supra* note 14, at pp. 141-143.

¹⁸ The VMS used by the Maldives already has this feature and Peru also contemplates this. It not only gives indications on the location of tuna but also where other (illegally operating) vessels are most likely to operate.

¹⁹ See Section 4.3.1.1.

²⁰ It can probably often be argued that (1) even though the ship was located somewhere for a certain time, and (2) speed and navigation patterns indicate that it was engaged in fishing, it simply did not catch that much. Catch-estimations with a certain margin of error will therefore have to be established.

²¹ Cf. FAO VMS Guidelines, p. 5. Such hesitation is still evident in *P. Bagnato v. Australian Fisheries Management Authority*, (*Bagnato v. AFMA Case*) Administrative Appeals Tribunal (Australia), General Administrative Division, Case No. N97/929, Decision of 30 January 1998, at para. 36. In *D.A. Lane (Fisheries Investigator) v. M.P. Wallace (GPS Case)*, Auckland District Court (New Zealand), Case No. CRN 7004055329, Decision of 11 September 1998, the quality of evidence provided by GPS was recognized (GPS is "a notorious scientific instrument"; pp. 26 and 33).

surveillance. This is addressed in Section 3.2. While Section 4 looks at the law of the sea in relation to international legal aspects of satellite-based VMSs through ALCs, Section 5 looks at aspects in space law which are more relevant to SRS.

3 Satellite-based VMSs and Fisheries Management

Current international law recognizes that the marine living resources in a coastal State's maritime zones are within its sovereignty or sovereign rights and can in principle be managed, explored and exploited to the exclusion of other States.²² However, rather than giving the coastal State a *carte blanche* to do whatever it sees fit, a wide range of obligations seek to safeguard the interests of the international community. Depending, *inter alia*, on the type of species, coastal States are to ensure through sustainable management that their resources are not over-exploited, that appropriate account is taken of the objective of optimum utilization and that they cooperate with other States in relation to transboundary stocks.²³ Furthermore, while the LOSC already subjected freedom of fishing on the high seas to obligations on conservation and cooperation,²⁴ flag States have in the 1990s witnessed various global efforts to develop obligations that are both more stringent and more specific.²⁵ Clearly discernable in the evolution of the international law relating to fisheries management is the continuously increasing attention to the fact that in many, if not all, instances, sustainable fisheries management presupposes efforts in two key fields: data gathering and ensuring compliance with its management objectives.²⁶ Satellite-based VMSs assist States in both.

3.1 Data Gathering

As a first step, sustainable fisheries management should gather reliable data on the effects of harvesting on the targeted species which, after analysis, should lead to the adoption of sustainable management measures. Decades of experience in fisheries management have nevertheless shown that rather than this single-species approach, it is necessary to adopt a multi-species approach in which effects of harvesting on both targeted species and associated or dependent species should be taken into account.²⁷ More recent even is the

²² See Section 4.3.1.1 for a discussion on maritime zones.

²³ The importance of cooperation was most recently confirmed in the *Southern Bluefin Tuna (Provisional Measures)* Cases (Southern Bluefin Tuna Cases (Nos. 3 and 4) (New Zealand v. Japan; Australia v. Japan), requests for provisional measures, Order of 27 August 1999, <http://www.un.org/Depts/los>) before the International Tribunal for the Law of the Sea (ITLOS). For the purpose of this article, management is regarded as comprising both conservation and use (see the definitions of 'conservation' and 'management' used by S.N. Nandan, S. Rosenne (vol. eds.) and N.R. Grandy (ass. ed.), *United Nations Convention on the Law of the Sea 1982, A Commentary, Volume III*, The Hague/London/Boston, Martinus Nijhoff Publishers, 1995, at p. 29). The objective of sustainability (Art. 2 1995 Fish Stocks Agreement) is used instead of the qualification "proper" (Art. 61(2) LOSC). The 1995 FAO Code of Conduct uses "responsible fisheries" (Art. 2(c)), "effective conservation and management" (S. 6.1), "sustainable utilization" (Ss. 6.3 and 7.2.1), or "long-term conservation and sustainable use" (S. 7.1.1).

²⁴ See Art. 87(1)(e) in conjunction with Arts. 116-120.

²⁵ All the global instruments mentioned in Section 1 are meant here. For an analysis see: E. Hey, *Global Fisheries Regulations in the First Half of the 1990s*, 11 *International Journal of Marine and Coastal Law* 459-490 (1996).

²⁶ These two objectives are the core to the 'System of Observation and Inspection' within the framework of the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR Convention; Canberra, 20 May 1980. In force 7 April 1981, <http://www.ccamlr.org>). For a discussion see R. Rayfuse, *Enforcement of High Seas Fisheries Agreements: Observation and Inspection under the Convention on the Conservation of Antarctic Marine Living Resources*, 13 *International Journal of Marine and Coastal Law* pp. 579-605 (1998), in particular p. 588.

²⁷ See, for example, Art. 61(3) LOSC; Art. 5(b) 1995 Fish Stocks Agreement. W.T. Burke, *The New International Law of Fisheries. UNCLOS 1982 and Beyond*, Oxford, Clarendon Press, 1994, p. 58 regards associated species as including "incidental catches or by-catches" and dependent species as including

advent of the ecosystem approach, which encompasses not only the effects of harvesting on both targeted species and associated or dependent species, but also of associated activities such as pollution.²⁸ Although perhaps not management approaches proper, community-based management²⁹ and precautionary approaches³⁰ provide for further refinements to fisheries management.

Whichever management approach is pursued, the relevant global instruments all recognize the key role of data gathering by obliging States to undertake such data gathering³¹ and by stipulating that in taking management measures, account shall be taken of the “best scientific evidence available”.³² Worth realizing is that data gathering is not limited to biological/resources assessment data (including fishing trends, patterns, interdependencies of stocks, and environmental aspects) but extends to data on fishery capacity (fishermen, boats and gear) and social and economic data on the harvesting, processing and marketing sections of fisheries.³³ As should be clear from this enumeration, data gathering requires conducting scientific research in many cases, but not all.³⁴

The standard which scientific evidence should meet is commonly set at “best (...) available”, which recognizes the difficulty of data gathering for the purpose of fisheries management. These difficulties do not only originate from humanity’s limited knowledge of the marine environment or the technical and economic aspects of fishing practices, but point to any constraint, be it time, financial or capacity, which is experienced by fisheries management authorities. Uncertain, unreliable or inadequate scientific data necessitates at any rate that proper account should be taken of the precautionary principle.³⁵ Obviously, assessing whether a fisheries management authority adequately complies with its data gathering duties is an extremely difficult task for any management approach but above all for ecosystem management.³⁶

It is also worth pointing out that in deciding upon certain management measures, all gathered data must be weighed simultaneously, without any guidance on the weight of each individual data-category. Closely related thereto is the fact that, although restrained by obligations to prevent over-exploitation and to promote optimum utilization (where relevant), fisheries management authorities are still left with a wide discretion in deciding upon the preferred management objective.³⁷

“predator-prey or more distant food, or other biological relationships”. However, Arts. 5(f), 6(3)(d) and 6(5) 1995 Fish Stocks Agreement clearly treat ‘non-target’ species distinct from associated or dependent species.

²⁸ See, for example, Art. 5(d) 1995 Fish Stocks Agreement; para. 17.71 Agenda 21.

²⁹ See *The State of the World Fisheries and Aquaculture. 1998*, Rome, FAO, 1999 (referred to as: SOFIA 1998), at Box 11.

³⁰ See Arts. 5(c) and 6 (Annex II) 1995 Fish Stocks Agreement; Ss. 6.5 and 7.5 1995 FAO Code of Conduct.

³¹ For example, Arts. 5(j and k), 9(d), 10(d, e, f and g), 14 and Annex I to the 1995 Fish Stocks Agreement; S. 7.4 and Art. 12 1995 FAO Code of Conduct.

³² For example, Art. 61(3) LOSC; Art. 5(b) 1995 Fish Stocks Agreement; Ss. 6.4, 7.1.1 and 7.4.1 1995 FAO Code of Conduct.

³³ Art. 61(5) LOSC enumerates “scientific information, catch and fishing effort statistics and other data relevant to the conservation of fish stocks”. See also paras. (3) and (4) of the same provision. Art. 14(1)(a) 1995 Fish Stocks Agreement refers to “scientific, technical and statistical data” (see also Arts. 1(1), 3 and 4 of Annex I). The Introduction to the 1995 FAO Code of Conduct refers to “the nutritional, economic, social, environmental and cultural importance of fisheries” (see also Art. 2(a)).

³⁴ The term ‘scientific research’ is preferred above ‘marine scientific research’ (MSR). The latter term, which is *inter alia* governed by Part XIII of the LOSC, is defined by A.H.A. Soons, *Marine Scientific Research and the Law of the Sea*, The Hague, T.M.C. Asser Institute/Deventer, Kluwer Law and Taxation Publishers, 1982, at p. 6 as “any study or related experimental work designed to increase man’s knowledge of the marine environment. Thus, it encompasses any scientific work, wherever carried out, having the marine environment as object” (footnote omitted; see also pp. 118-125).

³⁵ Art. 6(2) 1995 Fish Stocks Agreement. This does certainly not automatically mean that fishing is not allowed.

³⁶ Cf. Burke 1994, *supra* note 27, at p. 57.

³⁷ This is, *inter alia*, reflected in the words: “as qualified by (...) economic factors, including the economic needs of coastal fishing communities and the special requirements of developing States” in Art. 61(3) LOSC. Instead of aiming for maximum sustainable yield, it could therefore be decided to strive for straight

Through the monitoring of vessel movements, the ability to cross-check these data with catch-statistics and the wide range of other information which can be transmitted, satellite-based VMS thus assist management authorities in complying with their data-gathering obligations under international law.

3.2 Ensuring Compliance and MCS

In light of the already identified tendency of marine capture fisheries to lead to over-exploitation and economic inefficiency, the significance of ensuring compliance with fisheries management can hardly be overstated. Ensuring compliance is generally associated with 'monitoring, control and surveillance' (MCS). Although many instruments make standard reference to the MCS of fisheries, definitions of the individual elements are often lacking. Although the term 'monitoring' is not defined in the LOSC, it nevertheless appears in Articles 202, 204, 205, and 206. Article 204, entitled "Monitoring of the risks or effects of pollution", is particularly interesting since paragraph (1) mentions several possible methods by which environmental impact can be monitored, *viz.* observing, measuring, evaluating and analyzing. Paragraph (2) stipulates furthermore that States shall keep the effects of certain activities "under surveillance", which could be interpreted as meaning that surveillance is (sometimes) part of the monitoring effort. The leading commentary on the LOSC cites an official of the Intergovernmental Oceanographic Commission who indicates that "monitoring is understood as repeated observations following the same methods at given sites."³⁸

Specifically for the context of fisheries the following definitions have been suggested:

monitoring:	the continuing requirement for the measurement of fishing effort characteristics and catches
control:	the legal framework within which the resource must be exploited, <i>i.e.</i> , management schemes
surveillance:	those measures required to ensure compliance with the regulations formulated under 'control' ³⁹

The "measures required to ensure compliance" are presumably intended to cover the whole range of enforcement measures, *viz.* boarding, (physical) inspection, arrest and judicial proceedings.⁴⁰ Not too much emphasis should be put on distinguishing between the different components of MCS, if only because they do not fit to all specific circumstances.⁴¹ As the purpose of MCS is "to ensure that management measures, once agreed and adopted by a

economic need (whether optimal profit or optimal employment) or protein need (*cf.* P. Flewweling, *An Introduction to Monitoring, Control and Surveillance Systems for Capture Fisheries*, FAO Fisheries Technical Paper No. 338, Rome, FAO, 1994, p. 30; see also Art. 24 1995 Fish Stocks Agreement). The fact that Art. 61(2) LOSC links scientific data to an obligation of "taking into account" also reflects the predominance of the wider management context (*cf.* Burke 1994, *supra* note 27, at p. 56).

³⁸ Cited by S. Rosenne and A. Yankov (vol. eds.), N.R. Grandy (ass. ed.), M.H. Nordquist (ed.-in-chief), *United Nations Convention on the Law of the Sea 1982. A Commentary, Volume IV*, Dordrecht/Boston/London, Martinus Nijhoff Publishers, 1991, p. 111, n. 2.

³⁹ FAO Doc. CECAF/TECH/81/35, *Report of the Consultation on Monitoring, Control and Surveillance, Dakar*, FAO, 1981 (as cited by M. Cirelli and A. Van Houtte, *Legal Aspects of Cooperation in Monitoring, Control and Surveillance in the Southwestern Indian Ocean*, in: '1996 Mauritius Workshop', *supra* note 11, at p. 77). Slightly different definitions are used in FAO Doc. FAO/GCP/INT/344/NOR, *Report on an Expert Consultation on MCS for Fisheries Management*, Rome, FAO, 1981 (as cited by Flewweling 1994, *supra* note 37, at p. 7). Note that elsewhere (p. 9), Flewweling seems to follow the other definitions). See also Art. 5(l) 1995 Fish Stocks Agreement which, in relation to MCS, simply refers to implementation and enforcement. However, S. 7.1.7 1995 FAO Code of Conduct refers to "fisheries monitoring, surveillance, control and enforcement" (Ss. 7.7.3 and 8.1.4 are more or less identical).

⁴⁰ See Art. 73(1) LOSC.

⁴¹ For example, the Preamble to EC Council Regulation No 2847/93 (for full citation see Section 6.2) appears to give 'control' a meaning which is more oriented towards enforcement (see the 5th and 9th 'Whereas'). This could be due to the fact that in Community law, 'control' is generally associated with enforcement.

competent authority, are implemented fully and expeditiously”,⁴² MCS should properly be regarded as covering the whole range of measures aimed at the implementation of fisheries management goals.⁴³ Moreover, even if a competent fisheries authority would succeed in reaching consensus on a distinction, there is always a risk that over-rigid adherence thereto negatively affects cooperation and, consequently, leads to duplication of effort and/or inefficiency.

Satellite-based VMSs are therefore an important tool in efforts on MCS and, as Section 3.1 indicated, also contribute to data gathering. Whereas devoting adequate effort to MCS is in principle in the own interest of a fisheries management authority, there may be a multitude of reasons behind a failure to do so. Limited financial resources could be one of these but, for instance, also the fact that coastal States managing fisheries in their own maritime zones may not perceive this ‘own interest’ in the same way as flag States involved in a loosely operating regional high seas fisheries management mechanism. Partly for this reason, the relevant global instruments impose obligations on States to engage in MCS in general⁴⁴ and (satellite-based) VMSs in particular.⁴⁵

The surveillance component of MCS can be conducted in a variety of ways. In addition to satellite-based VMSs and the more traditional forms of VMSs mentioned in Section 2, surveillance could for example take place in ports of landing, at auctions, or by tracing fish and fishproducts. Singling out one of these forms of surveillance will never be successful as each has its pros and cons. For example, on-board inspections at sea are costly and can be dangerous due to weather circumstances or aggressive fishing-crews. In contrast with in-port inspections, however, the fish actually on board or in the process of being caught, the handling of the gear, the processing and storage and verification of the processes for handling waste can all be much better monitored.⁴⁶ Therefore, a mix of various forms of surveillance will have to be used that is tailored to the regulatory area. For that purpose the following factors could be taken into account:⁴⁷

- the size of the regulatory area, the part in which the actual fishing takes place and the topography of the coastline;
- the type of stocks and their level of exploitation;
- the type and size of fishery, *i.e.* industrial/artisanal or domestic/foreign;
- the nature and extent of infringements and the effectiveness of flag State control (if relevant);
- other social and economic considerations, such as the human and financial resources available for enforcement in relation to the fisheries’ revenue in social and economic terms;
- the (lack of) support of stakeholders in fisheries for certain types of VMS;⁴⁸

⁴² FAO Doc. COFI/97/INF.6, *Essential Role of Monitoring, Control and Surveillance in Fisheries Management*, December 1996.

⁴³ Cf. B. Hersoug and O. Paulsen, *Monitoring, Control and Surveillance in Fisheries Management*, Windhoek, University of Namibia, 1996, p. 1. Flewweling 1994, *supra* note 37, at p. 7 submits that MCS “includes the implementation of operations necessary to effect an agreed policy and plan for oceans and fisheries management”. The abbreviation MCS would therefore seem to perform a similar function as the phrase “prevent, reduce and control pollution” which recurs continuously in the LOSC, leading E.J. Molenaar, *Coastal State Jurisdiction over Vessel-Source Pollution*, The Hague/Boston/London, Kluwer Law International, 1998, p. 2, n. 5 to observe that “As a whole this phrase is probably intended to cover all possible measures to combat pollution, in whatever phase”.

⁴⁴ See, for instance, para. 17.67 Agenda 21; Arts. 5(l), 10(h) and 18 and Art. 6 (Annex I) 1995 Fish Stocks Agreement; Ss. 6.10, 7.1.7, 7.7.3 and 8.1.4 1995 FAO Code of Conduct.

⁴⁵ *Inter alia* in Arts. 5(j) and 18(3)(e and g(iii)) and Arts. 5 and 6 (Annex I) 1995 Fish Stocks Agreement; S. 7.7.3 1995 FAO Code of Conduct.

⁴⁶ Cf. Flewweling 1994, *supra* note 37, at p. 39.

⁴⁷ Predominantly based on FAO Doc. COFI/97/INF.6, para. 2 (*supra* note 42).

⁴⁸ A relevant factor in relation to satellite-based VMSs is the possibility of other applications (see *infra*).

- the potential for successful cooperation with other States at a regional or sub-regional level; and
- the political will and commitment to make optimal use of the chosen VMS.

The cost-effectiveness assessment of these and perhaps a number of other considerations⁴⁹ should ultimately lead to the optimum surveillance mix. Sadly enough, it so appears that an accurate assessment is only feasible with information obtained through MCS. At least potentially, choices could therefore be guided by unfounded perceptions of the causes of identified problems, for example by exclusively accusing foreign, and not national, fishermen of over-fishing or illegal fishing.⁵⁰ As a rule of thumb, it seems safe to say that satellite-based VMSs are more appropriate for industrial than for artisanal fishing, as the latter commonly involves a large number of fishers, mixed gears and landing points.

Arguably, a successfully operating satellite-based VMS (with or without SRS or OHR) will work as a deterrent, thereby permitting diminished use of traditional means of surveillance.⁵¹ Enhanced peer pressure by those having to install ALCs could also improve overall compliance. Appropriate consideration should likewise be given to other applications of satellite-based VMSs than those under discussion. The use of ALCs will often also enable two-way communication and thereby provide fishing operators with applications such as SafetyNET (designed to promulgate maritime safety information) or FleetNET (news and weather broadcasts, market quotations etc.).⁵² Moreover, SRS could be used for a wide range of military and non-military uses, for example vessel detection for other purposes (smuggling), detection of marine pollution or algae blooms, coastal zone and forest management and collating climate and meteorological information.⁵³

3.3 Integrating Satellite-based VMSs in Fisheries Management

Once a fisheries management authority has taken the decision to use a satellite-based VMS, it will be necessary to tailor the system to its needs. A primary consideration would be the system's purpose: data gathering, ensuring compliance or both. This choice will be decisive for the way in which the system is to be integrated in the framework of fisheries management. Subsequently, the operational requirements of the satellite-based VMS will have to be determined, for example the type of system (Argos, Inmarsat-C etc.) and ALC, the scope of application (geographically and type(s) of ships) and the type of information transmitted (identity, location, frequency, addressee, etc.).

Secondly, apart from complementing satellite-based VMSs with other forms of enforcement, it will have to be incorporated in the legal framework of fisheries management, or the control component in MCS. This would require for example:

- licensing;
- requirements on vessel marking and identification;
- catch reporting by logbook or otherwise;

⁴⁹ A rather sensitive issue in relation to satellite-based VMSs is the aspect of security of information. Not only will those actually involved in fishing fear unfair competition but, if applied between two or more States, this would also more clearly reveal those States' enforcement commitment. For a cost-effectiveness assessment of VMS, see the *Bagnato v. AFMA* Case, *supra* note 21.

⁵⁰ Cf. Flewwelling 1994, *supra* note 37, at p. 4.

⁵¹ FAO VMS Guidelines, pp. 6-7. The EC believes it will lead to "an increase of 20% in the effectiveness of marine surveillance, which has an estimated cost of MEuro 100" (Effective Monitoring to Ensure Sustainable Fisheries, http://europa.eu.int/comm/dg14/info/control_en.htm, 19 May 1999, p. 10). Similarly, M.W. Lodge, *The South Pacific Forum Fisheries Agency and Legal Aspects of Fisheries Monitoring, Control and Surveillance*, in: '1996 Mauritius Workshop', *supra* note 11, at p. 162 observes that "[c]apital costs are much lower than the cost of a surface patrol vessel or aircraft".

⁵² Cf. Fitzpatrick 1997, *supra* note 14, at p. 125.

⁵³ Jansen 1999, *supra* note 15, at p. 6.

- prescribing fixed ports of landings; and
- controlling transshipments.⁵⁴

Without overstepping the limits set by applicable international law,⁵⁵ enactments should be unambiguous, regarded as acceptable by those regulated⁵⁶ and conducive to effective and easy enforcement. Penalties should be adequate in severity to deter violations. More specifically related to satellite-based VMSs, the use of logbooks and ALCs should be underpinned by a number of obligations aimed at avoiding obstruction of regulatory efforts.⁵⁷ Not observing these obligations could be regarded as separate offenses. In addition, a responsible use could be made of a rebuttable presumption of guilt, requiring the alleged offender to establish its innocence.⁵⁸ Closely related thereto is the recommendation that due consideration should be given to the categorization of regulatory offenses. In many legal systems criminal law usually demands a heavier standard of proof in comparison with civil or administrative law.⁵⁹

Finally, the pivotal role of one particular aspect cannot be emphasized enough: confidentiality and security of information is essential for the success of satellite-based VMSs. In many fisheries, the possibility that near real-time location and/or catch data ends up in the hands of (non-participating) competitors is bound to have enormous impact on acceptance and, if already in operation, on compliance and cooperation. Confidentiality and security risks will in general increase when the VMS information is shared by more parties, and appropriate measures will have to be taken to address these risks.⁶⁰ The aforementioned risks exist in every phase of transmission and all those involved - States, companies and organizations alike - should exercise the utmost diligence on this issue. This may, for instance, require the enactment of legislation to counter breaches of confidentiality or security.

This does not necessarily mean that fisheries management authorities should have exclusive access to the information transmitted by ALCs. The applicable legal framework may guarantee others a right of access as well. One situation which springs to mind is where location data are essential in criminal investigations for non-fisheries offences, for example smuggling.⁶¹ Moreover, it may not always be objectionable that operators whose vessels participate in the VMS have access to certain information as well. While access to near real-time data will in many types of fisheries be out of the question, periodical access to the overall results of the analysis of transmitted information could assist in more effective fishing (more catch in less or shorter fishing trips). Disclosure of the latter information is of course only recommended if adequate measures to prevent over-fishing are in place. Again,

⁵⁴ For transshipments see Section 4.3.1.3.

⁵⁵ See for example the restrictions discussed in Section 4.3.1.4.

⁵⁶ See S. 7.1.10 1995 FAO Code of Conduct.

⁵⁷ The FAO VMS Guidelines, pp. 24-27 discuss the following ways of obstructing satellite-based VMSs: blocking transmission at the antenna; disruption of power supply; physical removal of ALC; duplication of ALC; and transmission of false position.

⁵⁸ See D. Freestone, *The Burden of Proof in Natural Resources Legislation. Some Critical Issues for Fisheries Law*, FAO Legislative Study No. 63, Rome, FAO, 1998. Freestone refers on p. 8 to S. 15(1) of the 1979 Control of Foreign Fishing Vessels Decree of the Seychelles, which provides that fish found on board a vessel within its maritime zones is presumed to have been caught therein. Under subsection (2), this presumption can be rebutted if prior to entry into the EEZ, the fishing vessel makes a radio call in which it indicates that it is exercising its right of free navigation through the EEZ, and notifies its proposed route and quantity of fish on board. On p. 23 Freestone argues that this kind of presumption gives reason for concern. See also the use of a reversal of burden of proof in Arts. 13(5a) and 28(g) EC Council Regulation No 2847/93, (consolidated text; see Section 6.2). See also W.T. Burke, *Fisheries Regulations under Extended Jurisdiction and International Law*, Rome, FAO Fisheries Technical Paper No. 223, 1982, p. 15.

⁵⁹ For example in the United States. We are grateful to Mr. P. Ortiz from the United States National Oceanographic and Atmospheric Administration (NOAA) for his views on this point.

⁶⁰ For an example of such measures see Attachment V to the NEAFC Scheme (see Section 6.3).

⁶¹ One of the reasons contributing to the establishment of the New Zealand VMS was the inability to trace trawlers that violated exclusion zones (see Section 4.3.1.1) and thereby caused extensive damage to submarine telephone cables.

it is imperative for the success of a satellite-based VMS that fishing operators accept and have faith in the issue of access to information.

4 Satellite-based VMSs and the Law of the Sea

4.1 Flag, Coastal and Port States

An analysis of the scope of application of a satellite-based VMS should commence with clarifying the distinction between the different actors involved in the exercise of jurisdiction over fisheries. Within this domain, international law allocates jurisdiction to States acting in different capacities: as flag, coastal or port States. It is of course very rare for States to exercise jurisdiction in one single capacity only, e.g. as a flag State. They will commonly exercise jurisdiction in all three capacities, even though their rights and obligations will vary for each different capacity.⁶²

While several definitions for the term flag State can be chosen, the definition used here is: the State whose nationality a particular vessel has.⁶³ Unfortunately, the LOSC does not define 'port' or 'coastal' State.⁶⁴ Drawing on the definitions used in relation to vessel-source pollution,⁶⁵ it is submitted that the exercise of jurisdiction by coastal States concerns foreign ships that engage in fishing activities⁶⁶ in that coastal State's maritime zones, whether or not this foreign ship makes a call at one of that coastal State's ports or anchorages. Jurisdiction by port States, on the other hand, concerns activities that take place beyond the maritime zones of the coastal State in which it is situated, *viz.* on the high seas or in another coastal State's maritime zones. This type of activity affects the interests of the coastal State (merely) indirectly. Worth emphasizing is that port or coastal State jurisdiction always implies jurisdiction over foreign vessels. Jurisdiction over a State's own vessel implies acting in the capacity as flag State.

With the relevant actors more clearly defined, the discussion will now proceed to flag, coastal and port State approaches towards satellite-based VMSs.

4.2 Flag State Approaches

A flag State approach relies on the flag State's competence to exercise jurisdiction over ships that have chosen to bear that State's nationality. As a condition for granting a ship its nationality, the flag State can require it to install the necessary equipment for a satellite-based VMS.⁶⁷ The particular manner or extent in which flag States exercise their rights or competences remains largely within their own discretion. The benchmark is therefore commonly the flag State's own constitutional framework and not so much international law.⁶⁸

⁶² A State's rights and obligations with respect to its own ships (flag State) is therefore potentially different in case its ships fish on the high seas, compared to when they would fish in the flag State's maritime zones (coastal State). See the discussion after this footnote in the main text.

⁶³ Cf. R.R. Churchill and A.V. Lowe, *The Law of the Sea*, Manchester, Manchester University Press, 3rd ed., 1999, p. 257. The right to fly a flag and the ship's nationality are linked in Art. 91(1) LOSC which, *inter alia*, provides: "Ships have the nationality of the State whose flag they are entitled to fly". Art. 91(1) LOSC mentions another possible definition, *viz.* the State in whose territory the ship is registered.

⁶⁴ In the LOSC 'coastal State' appears only in relation to the territorial sea, contiguous zone, EEZ and the continental shelf, but not with respect to straits, archipelagos, the high seas, the regime of islands, enclosed or semi-enclosed seas, the right of access of landlocked States to and from sea, and freedom of transit.

⁶⁵ See Molenaar 1998, *supra* note 43, at pp. 91-95.

⁶⁶ See Section 4.3.1.3.

⁶⁷ See Art. 91(1) LOSC.

⁶⁸ See, for example, the *Bagnato v. AFMA* Case, *supra* note 21, in which the Applicant contested the need for a VMS. After a cost-effectiveness analysis of VMS, Deputy President McMahon decided that the requirement to install ALCs "is the correct and preferable decision" (para. 52).

Rather than being only characterized in terms of competence, however, international law also imposes a wide range of obligations on the flag State. Pursuant to Article 94 LOSC a flag State has the obligation to exercise effective jurisdiction and control over ships flying its flag.⁶⁹ Although the ship's location is essentially irrelevant, the spatial scope of coastal State jurisdiction (which leads to concurrent jurisdiction) implies that the high seas are of paramount importance. Neither this general norm nor the norms identified in Section 3.2 that more specifically relate to MCS, amount to a requirement to ensure that ships install ALCs.⁷⁰ If support for such an obligation at the global level might materialize in the future is difficult to say. While global coverage would have the advantage of minimizing unfair competition, securing agreement on an acceptable measure of uniformity in performance standards, including data formats, may turn out to be an enormous task. Not only are Argos, Eutelsat and Inmarsat-C equipment currently not exactly compatible,⁷¹ deciding which types of vessels and/or fisheries should be covered would be particularly difficult.

Just how difficult such decisions are can be seen in the ongoing efforts of the Maritime Safety Committee (MSC) and its Sub-committee on the Safety of Navigation (NAV) of the International Maritime Organization (IMO), who are in the process of securing agreement on the carriage requirements of a universal automatic identification system (AIS). This system is aimed at enhancing the safety of navigation and pollution prevention,⁷² and could rely on any kind of communication, including satellite. The MSC agreed that "only one universal AIS should be implemented on a long-term basis", but is not yet near to this objective.⁷³

In this context mention should also be made of the 1993 Protocol to the International Convention for the Safety of Fishing Vessels (Torremolinos Convention).⁷⁴ Its Chapter IX, 'Radiocommunications', contains regulations for fishing vessels of 45m in length and over, including provisions for equipment that makes use of certain satellite communications systems, such as Inmarsat and COSPAS-SARSAT, which could be used or adapted for the purpose under discussion. However, for this to happen the 1993 Protocol would first have to enter into force and this seems to take some time yet.⁷⁵ In fact, one of the reasons that the Torremolinos Convention never entered into force was the great differences in design and operation between ships. Nevertheless, many flag States have already voluntarily proceeded to implement (parts of) the 1993 Protocol.

A satellite-based VMS would, in principle, enable flag States to follow their ships anywhere on the globe.⁷⁶ As this guarantees continuous monitoring, it would constitute a

⁶⁹ Specifically in relation to fisheries, see Art. III 1993 FAO Compliance Agreement, Art. 18(2) 1995 Fish Stocks Agreement and S. 6.11 1995 FAO Code of Conduct.

⁷⁰ For example, Art. 18(g)(iii) 1995 Fish Stocks Agreement, which lists MCS as one of the measures which flag State should take, refers to "the development and implementation of vessel monitoring systems, including, *as appropriate*, satellite transmitter systems" (emphasis added). Similarly, the 1995 FAO Code of Conduct's Technical Guideline No. 1 (Fishing Operations), which is of course voluntary, confirms this by observing that the flag State 'authorization to fish' "should contain" conditions with regard to vessel position reporting and "could include a requirement" to install ALCs (at pp. 7 and 9, paras. 22 and 34).

⁷¹ Cf. Fitzpatrick 1997, *supra* note 14, at pp. 128 and 138.

⁷² AIS would *inter alia* facilitate identification of ships suspected of discharge violations. See IMO Docs. MSC 67/7/11 and MEPC 39/12.

⁷³ IMO Docs. NAV 43/15, paras. 7.36-7.46; MSC 67/22, paras. 7.64-7.68; MSC 69/22/Add.1, paras. 5.77-5.81 and Annex 12 (Resolution MSC.74(69) and Annex 3). By Resolution MSC.74(69), the MSC *inter alia* adopted a "Recommendation on Performance Standards for an Universal Shipborne Automatic Identification System (AIS)". Carriage requirements for AISs were discussed in NAV 45 (September 1999) and were included in Chapter V of SOLAS 74 as Regulation 19(1.5) (see IMO Doc. NAV 45/14/Add.1, Annex 6). The revised Chapter V is expected to enter into force on 1 July 2002. Information kindly obtained from V. Lebedev, IMO.

⁷⁴ The Convention was adopted in Torremolinos, on 2 April 1977. The 1993 Protocol was also adopted in Torremolinos, on 2 April 1993.

⁷⁵ As at 31 December 1999 the 1993 Protocol had been ratified by 5 States. Entry into force will take place one year after 15 States with at least an aggregate fleet of 14,000 vessels equivalent to approximately 50% of today's world fishing fleet of vessels of 24 metres in length and over, have ratified the Protocol (<http://www.imo.org>).

⁷⁶ This approach is pursued by the EC.

particularly strong commitment to the flag State's duty to exercise effective jurisdiction and control. However, if the transmitted information is much more extensive than identification and location data and its vessels operate in another State's maritime zones, the consent of that coastal State may have to be sought. The use of on-board sensors, for example to measure sea temperature or salinity, could at a certain point effectively amount to marine scientific research (MSR) and thus be subject to Part XIII of the LOSC.⁷⁷ Moreover, even where it concerns merely position reports, the flag State and the coastal State can agree that these data will be forwarded to the coastal State.

Enforcement by the flag State (with respect to its own ships) could, in principle, be undertaken anywhere on the high seas and also within another State's exclusive economic zone (EEZ).⁷⁸ In case a vessel is located within the sovereignty of another State's,⁷⁹ its flag State is either required, but in any case advised, to consult that coastal State on the appropriateness of action taken.

4.3 Coastal State Approaches

The key-issue which this Section seeks to address is to what extent coastal States can require foreign vessels that engage in certain activities in their maritime zones to install ALCs and to what extent enforcement would be permissive. The main emphasis will be on the territorial sea, archipelagic waters, EEZ and continental shelf. No attention will be paid to the contiguous zone as Article 33 LOSC does not permit the exercise of prescriptive jurisdiction within its spatial limits. The wide enforcement powers over fisheries to which the coastal State is entitled in the EEZ, would also render separate attention to the contiguous zone in this context unnecessary. Finally, apart from the right of hot pursuit under Article 111 LOSC, no attention is given to coastal State enforcement powers on the high seas.⁸⁰

A distinction is first of all made between prescription (legislative jurisdiction) and enforcement. The discussion on prescription is then further subdivided into foreign fishing vessels with licenses, foreign fishing vessels in lateral passage (without licenses), foreign fishing support vessels and general limits to prescription. The first three of these subsections investigate scenarios in which coastal States might wish to use their prescriptive powers over foreign vessels. The fourth subsection deals more generally with limits to prescription. Lastly, even though safeguards such as those incorporated in paragraphs (2), (3) and (4) of Article 73 LOSC are part and parcel of the jurisdictional balance in the LOSC, their discussion is omitted as it would take up too much space.

4.3.1 Prescription

4.3.1.1 Foreign Fishing Vessels with Licenses

In its territorial sea, a coastal State exercises sovereignty and has pursuant to Article 21(1)(d) LOSC prescriptive jurisdiction with respect to "the conservation of the living resources of the sea". In addition, Article 19(2)(i) LOSC provides that a foreign ship which engages in "any fishing activities" in the territorial sea loses its right of innocent passage.⁸¹ Obviously, this does not apply to those ships which have been authorized to fish. These two

⁷⁷ See Section 5.

⁷⁸ See Art. 92(1) LOSC, which applies through Art. 58(2) LOSC to the EEZ as it is not "incompatible with [Part V on the EEZ]".

⁷⁹ For the maritime zones which fall under a State's sovereignty see Section 4.3.1.1.

⁸⁰ For a global instrument which deals with this issue see Arts. 19(1)(a), 20(6), 21 and 22 1995 Fish Stocks Agreement. For a more general discussion see M. Hayashi, *Enforcement by Non-Flag States on the High Seas Under the 1995 Agreement on Straddling and Highly Migratory Fish Stocks*, 9 Georgetown International Environmental Law Review 1-36 (1996).

⁸¹ See also the discussion in Section 4.3.2.

provisions indicate that the coastal State is permitted to impose any reasonable type of requirement as a pre-condition for fishing in the territorial sea, including the fitting of ALCs.

The situation with respect to the archipelagic waters which can be established in accordance with Article 47 LOSC, is quite similar to the regime in the territorial sea. Articles 2(1) and 49(1) LOSC recognize the archipelagic State's sovereignty over its archipelagic waters, while Article 52(1) upholds the right of innocent passage in accordance with Part II, Section 3 (the regime of innocent passage in the territorial sea). The observations and conclusions in relation to Articles 19(2)(i) and 21(1)(d) made in the previous paragraph would therefore apply in principle *mutatis mutandis*. However, whereas Article 49(2) provides that sovereignty extends to the resources in the archipelagic waters, Article 51(1) emphasizes that:

Without prejudice to article 49, an archipelagic State shall respect existing agreements with other States and shall recognize traditional fishing rights and other legitimate activities of the immediately adjacent neighbouring States in certain areas falling within archipelagic waters. The terms and conditions for the exercise of such rights and activities, including the nature, the extent and the areas to which they apply, shall, at the request of any of the States concerned, be regulated by bilateral agreements between them. Such rights shall not be transferred to or shared with third States or their nationals.⁸²

The archipelagic State is thus held to respect traditional fishing rights and barred from unilaterally regulating fishing by foreign fishing vessels that exercise such rights. However, once the archipelagic State would make a request for regulation through bilateral agreements, Article 51(1) does not give the other States concerned much room to ignore such a request, provided of course the demands of the archipelagic State are reasonable. Much in this context will also depend on what the States concerned regard as "traditional fishing rights". In case the States agree it is a more or less static concept, the catches will presumably not be substantial and the need for ALCs questionable.

Apart from the regime of innocent passage, the LOSC contains two other regimes which grant rights of navigation through areas under State sovereignty, *viz.* the regimes of transit passage and archipelagic sea lanes (ASLs) passage.⁸³ Although ships of all States enjoy these navigational rights, they do not affect the sovereignty of strait States and archipelagic States over the resources in such areas.⁸⁴ When exercising their rights of transit or ASLs passage, ships shall comply with the various requirements enumerated in Article 39(1 and 2). Relevant to our subject is the obligation to "refrain from any activities other than those incident to their normal modes of continuous and expeditious transit".⁸⁵ It is widely accepted that the reference to the 'normal mode' was explicitly included for military purposes, e.g. formation steaming and submarines proceeding submerged. No support exists for the view that the 'normal mode' would allow foreign fishing vessels to engage in fishing without having to obtain licenses. This would also be inconsistent with the strait and archipelagic States' competence to adopt laws and regulations relating to transit and ASLs passage "with respect to fishing vessels, the prevention of fishing, including the stowage of fishing gear".⁸⁶ Consequently, the rights of transit and ASLs passage do not effect the strait or archipelagic State's sovereignty with respect to regulating fisheries, including the requirement to install ALCs.

In its EEZ a coastal State has "sovereign rights for the purpose of exploring and exploiting, conserving and managing"⁸⁷ the living resources therein. In return for granting foreign fishing vessels access to the surplus in the total allowable catch (TAC), Article 62(4)

⁸² See also Art. 47(6).

⁸³ The regime of transit passage is incorporated in Section 2 of Part III, which is concerned with Straits used for International Navigation. ASLs passage is included in Part IV on Archipelagic States.

⁸⁴ Arts. 34(1) and 49(4). The regimes of transit and ASLs passage also grant rights of overflight to aircraft.

⁸⁵ Art. 54 in Part IV makes Art. 39 *mutatis mutandis* applicable. Art. 53(3) also uses "the normal mode".

⁸⁶ Arts. 42(1)(c) and Art. 54 (the latter by cross-reference).

⁸⁷ Art. 56(1)(a) LOSC.

LOSC permits a coastal State to set “terms and conditions”.⁸⁸ Subparagraph (e) recognizes that this would cover ALCs by explicitly permitting the coastal State to enact laws and regulations which require foreign vessels to provide “vessel position reports”.⁸⁹

A special situation arises in relation to “living organisms belonging to sedentary species” on the coastal State’s continental shelf.⁹⁰ The regime for such species is a *lex specialis* to the regime of other marine living resources in a coastal State’s EEZ.⁹¹ Due to the possibility of a legal continental shelf which extends beyond the EEZ,⁹² a coastal State’s sovereign rights for the purpose of exploring and exploiting these species would extend with it. These sovereign rights give coastal States the authority to require that foreign vessels licensed to harvest these species carry ALCs.

A regulatory measure with considerable potential for satellite-based VMSs are so-called ‘exclusion zones’ for the purpose of fisheries management. Within exclusion zones, the mere presence of fishing vessels subject to VMS constitutes an offense, unless justified by *force majeure* or the like.⁹³ Exclusion zones are thus considerably more onerous but also more effective than closed areas, as it is unnecessary to prove fishing activity. This could of course lead to a separate conviction if such evidence would also be available. Since the prohibition to transit exclusion zones, except through designated corridors, applies only to a specified group of licensed fishing vessels, domestic or foreign, the navigational rights and freedoms of other vessels remain unaffected. Such movement restrictions on licensed vessels would normally be within the coastal or flag State’s competence.

4.3.1.2 Foreign Fishing Vessels in Lateral Passage

The situation for foreign fishing vessels not authorized to fish in a coastal State’s maritime zones is, from the perspective of prescription, altogether different from ships with licenses. It may be evident that upon violating the coastal State’s laws and regulations by fishing in either the territorial sea, the archipelagic waters or the EEZ, the ship will be subject to enforcement action. This aspect will be discussed in Section 4.3.2. Rather, the question to be addressed here is whether or not ships without a license can be required to install ALCs

⁸⁸ A right to access to the surplus in the TAC does not exist in relation to the other maritime zones. In fact, the obligations on conservation and utilization of marine living resources incorporated in Arts. 61 and 62 are only explicitly applicable to the EEZ.

⁸⁹ Cf. the view of the UN Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs (DOALOS) in IMO Doc. LEG 70/7, para. 27 and the United States in IMO Doc. LEG 70/7/1, para. 7. See the discussion in the 70th session of IMO’s Legal Committee (LEG) in IMO Doc. LEG 70/10, paras. 90-91.

⁹⁰ Art. 77(4) LOSC defines these as: “organisms which, at the harvestable stage, either are immobile on or under the sea-bed or are unable to move except in constant physical contact with the sea-bed or the subsoil”. Churchill and Lowe 1999, *supra* note 63, at p. 142 argue that while agreement exists that this includes species such as oysters, clams and abalone, whether it also covers crabs and lobsters remains controversial. But see J.M. Van Dyke, *Modifying the 1982 Law of the Sea Convention: New Initiatives on Governance of High Seas Fisheries Resources: the Straddling Stocks Negotiations*, 10 International Journal of Marine and Coastal Law 219-227 (1995), at pp. 221-222, who refers to a dispute between Canada and the United States on the proper categorization of abalone.

⁹¹ See Arts. 56(3) and 77 LOSC. This also means that the coastal State obligations to prevent over-exploitation and to promote the objective of optimum sustainable yield pursuant to Arts. 61 and 62 respectively, are not applicable either; at least not based on the LOSC. This *inter alia* means that other States have no right to access to a surplus, if any (cf. E. Hey, *The Regime for the Exploitation of Transboundary Marine Fisheries Resources*, Dordrecht, Martinus Nijhoff Publishers, 1989, p. 49).

⁹² See Art. 76 LOSC.

⁹³ This regulatory measure is already in operation in Australia (Commonwealth, Queensland and Western Australia; Tasmania is preparing to have it incorporated in its legislative framework). At the beginning of 2000, the Australian Fisheries Management Authority (AFMA) was preparing to go to court for a case in which a fishing vessel was located in an exclusion zone. The fact that its navigation pattern suggests that it was engaged in fishing will probably be used to justify steeper penalties but not to prove a separate violation of fishing (information kindly provided by P. Gallagher, AFMA, January 2000).

as a pre-condition for the mere transit (lateral passage) through maritime zones, as such a requirement could be inconsistent with applicable rights of navigation.⁹⁴

The competence of coastal States in the territorial sea pursuant to Article 21(1)(d) LOSC has already been cited above. Foreign ships are, under paragraph (4) of that same provision, held to comply with these laws and regulations when exercising their right of innocent passage. However, paragraph (2) contains an important restriction on the coastal State's legislative powers by stipulating that "laws and regulations shall not apply to the design, construction, manning or equipment [CDEM] of foreign ships unless they are giving effect to generally accepted international rules or standards". It is important to note that this limitation applies to all CDEM standards, irrespective of the purpose of regulation.⁹⁵

The situation in archipelagic waters (beyond ASLs) is, due to the applicability of the regime of innocent passage, essentially identical to that in the territorial sea. With respect to areas subject to transit or ASLs passage, the LOSC does not contain a provision similar to Article 21(2) which would restrict strait and archipelagic State jurisdiction to 'generally accepted' CDEM standards. However, in view of the underlying rationale of these regimes, which ensures more extensive rights of navigation in comparison with the territorial sea, such a restriction must be presumed. The strait and archipelagic State prescriptive jurisdiction "with respect to fishing vessels, the prevention of fishing, including the stowage of fishing gear" cannot therefore be interpreted as conferring wider powers compared to what coastal States would have under the regime of innocent passage.⁹⁶

Within the EEZ a coastal State has the sovereign rights already cited before. Its legislative competence with regard to equipment standards is, pursuant to Article 211(5) LOSC, only possible "for the prevention, reduction and control of pollution from vessels". In the absence of other provisions on equipment standards, it must be presumed that coastal State powers are at any rate not more extensive than in the territorial sea.

In light of what has just been discussed, it is clear that the question which must be answered is whether or not the requirement to install ALCs must be regarded as an equipment (CDEM) standard. If this is answered in the positive,⁹⁷ this implies that coastal States cannot interfere with foreign ships merely exercising their rights of navigation through that coastal State's maritime zones. This would be different if initiatives at the international level have led this requirement to become 'generally accepted', but the discussion in Section 4.2 already noted that this situation has not yet materialized.⁹⁸ For ships transiting the EEZ, the LOSC simply does not even contain a basis for imposing a 'generally accepted' equipment standard for the purpose of fisheries management.

An argument in support of the view that the ALC requirement is not an equipment standard, is that all an ALC really does is facilitate the verification of compliance with lawful national and/or international regulatory efforts. Moreover, although installing ALCs brings along certain costs, they do not genuinely constrain the behavior or movement of ships; thereby leaving the essence of navigational rights unaffected. Apart from the costs-aspect, the requirement to install ALCs is largely similar to asking unlicensed foreign fishing vessels to give prior notification of entry into a coastal State's maritime zones even if they merely

⁹⁴ The phrase "rights of navigation" is used here in the widest sense: of comprising all the passage rights defined in the LOSC.

⁹⁵ This is an important distinction with Art. 211(5) LOSC which only concerns the "prevention, reduction and control of pollution from vessels". Similarly, the extensive coastal State powers under Art. 234 LOSC within ice-covered areas can only be exercised with respect to vessel-source pollution.

⁹⁶ Art. 42(1)(c) LOSC. See also Art. 39(2) which requires ships in transit passage to comply with generally accepted international regulations, procedures and practices for safety at sea and the prevention, reduction and control of pollution. This is a wider obligation in comparison with Art. 21(4).

⁹⁷ This view is *inter alia* held by Burke 1982, *supra* note 58, at p. 14.

⁹⁸ For a discussion on the possibility of standards becoming 'generally accepted' without the involvement of a competent international organization or general diplomatic conference (Arts. 21(2) and 211(6)(c) LOSC), see Molenaar 1998, *supra* note 43, at pp. 158-161.

intend to transit.⁹⁹ However, the coastal State's power to request prior notification is an issue fraught with controversy, particularly in relation to warships and ships carrying hazardous cargo.¹⁰⁰ Flag States are likely to oppose prior notification in the sphere of fisheries for the simple reason that it might 'spill over' to other areas.¹⁰¹ In the sphere of vessel-safety and pollution prevention, developments at IMO now enable coastal States to operate mandatory ship reporting systems beyond the territorial sea, provided IMO approval is obtained. Arguably, this implies that mandatory ship reporting systems that *do not extend beyond the territorial sea* can be adopted without IMO approval.¹⁰² There seem to be no reasons why this conclusion would not also apply if a ship reporting system would serve the purpose of fisheries management.

In the context of fisheries, there may be considerations which allow for a balance of jurisdiction which is even more favorable to the coastal State. With respect to the issue of prior notification exclusively, account should first of all be taken of the fact that the coastal State's power to board foreign fishing vessels in its maritime zones, is not as limited as the powers it would have in relation to vessel-source pollution. This is particularly true for the EEZ. Secondly, poaching poses great difficulties to not only developing States but also more general to States that have extensive ocean surfaces to monitor. Therefore, when the impact on navigation caused by the requirement to give prior notification or the costs for installing ALCs¹⁰³ is balanced with the coastal State's loss of income in fisheries, appropriate weight should be given to the consideration that the ultimate objective is that of ensuring compliance with lawful national and/or international regulatory efforts.¹⁰⁴

But while a case might with considerable difficulty be made for prior notification, whether or not within the framework of ship reporting systems, just the costs-dimension of ALCs already constitutes an unsurpassable hurdle. Finally, even a prior notification approach would by many States be treated as excessive and coastal States wishing to adopt it would therefore have to count on resistance.

4.3.1.3 Foreign Fishing Support Vessels

In addition to the distinction between national and foreign ships, and ships with or without a license, the issue of types of ships also needs to be addressed. While it remains within the coastal State's discretion to impose the ALC requirement on certain specific types of fishing vessels exclusively, or more generally on all fishing vessels engaged in a specific fishery,

⁹⁹ Prior notification has to be distinguished from an incidental request for information as part of the exercise of enforcement (see Section 4.3.2). Fitzpatrick 1997, *supra* note 14, at p. 133 regards prior notification or the requirement to install ALCs as unproblematic, even going as far as submitting that "[t]he coastal State should not unreasonably refuse permission for a foreign fishing vessel intent on innocent passage". He goes on by observing that "[f]urther requirements would be applicable in the case of vessels carrying harpoon guns". Relevant State practice already exists (see, for example, the requirement to give prior notification of entry under S. 15(1) of the 1979 Control of Foreign Fishing Vessels Decree of the Seychelles (*supra* note 58)). Burke 1982, *supra* note 58, at p. 13 submits that prior notification is reasonable whereas he considers regulating navigating of fishing vessels in lateral passage by sea lanes or designated areas commonly more objectionable (p. 12). France requires all fishing vessels and vessels carrying fish that wish to transit the EEZs around its *Terres australes*, to notify entry and declare the amount of fish on board (Law No. 96-609, of 5 July 1996, Art. 11-I, Ordinance No. 98-523, of 24 June 1998, Art. 2).

¹⁰⁰ See E.J. Molenaar, *Navigational Rights and Freedoms in a European Regional Context*, in: 'Navigational Rights and Freedoms and the New Law of the Sea', D.R. Rothwell and S. Bateman (eds.), The Hague/London/Boston, Kluwer Law International, 2000 (forthcoming).

¹⁰¹ Cf. Burke 1982, *supra* note 58, at p. 1.

¹⁰² Cf. Molenaar 1998, *supra* note 43, at pp. 212-216. See also the discussion in note 132 *infra*.

¹⁰³ Account should in fact be given to relative costs, which are considerably higher for artisanal fisheries in comparison to industrial fisheries.

¹⁰⁴ It is noteworthy that S.N. Nandan, S. Rosenne (vol. eds.) and M.H. Nordquist (ed.-in-chief), *United Nations Convention on the Law of the Sea 1982, A Commentary, Volume II*, Dordrecht/Boston/London, Martinus Nijhoff Publishers, 1993, p. 565 submit that the problem of illegal fishing "may require the coastal State to take protective measures that unavoidably impact on passing vessels".

this is not necessarily the same with ships that are not themselves engaged in fishing but give support to ships that do. As these ships could be used to evade fisheries management regulation, not covering them would be a weak spot in the compliance effort. Conversely, a definition of ‘fishing support vessels’ which is too broad risks being in conflict with rights of other States in the maritime zones of the coastal State.

Rather than targeting fishing support vessels, however, the coastal State always has another option: *viz.* to require that fishing vessels, while in the coastal State’s maritime zones, shall not be assisted by fishing support vessels unless these latter vessels also comply with certain requirements (e.g. installing ALCs).¹⁰⁵ While it cannot be denied that this stretches coastal State sovereignty or sovereign rights considerably, this does not necessarily happen to the extent of amounting to an abuse of rights.¹⁰⁶ Provided applicable requirements such as necessity are met, the fact that this activity occurs within the coastal State’s maritime zones and affects its sovereignty or sovereign rights seems to be a key-consideration.

Each of the global instruments relevant to marine fisheries that has been adopted in the 1990s recognizes in one way or another that flag State obligations also extend to vessels that are not engaged in fishing as such. Only the 1993 FAO Compliance Agreement goes as far as incorporating a definition. Article I(a) defines fishing vessel as “any vessel used or intended for use for the purposes of the commercial exploitation of living marine resources, including mother ships and any other vessels directly engaged in such fishing operations”. Although Sections 6.10, 6.11 and 7.8.1 1995 FAO Code of Conduct distinguish “fishing vessels” from “fishing support vessels”, definitions are not provided. Elsewhere the 1995 FAO Code of Conduct uses either “fishing operations” or “fishing activities”.¹⁰⁷ The 1995 Fish Stocks Agreement contains references to both “fishing operations” and “fishing activities”.¹⁰⁸

The approaches in each of these global instruments clearly vary from each-other. For that reason and due to the dissimilar scopes of application of these instruments, their nature and their inter-relationships,¹⁰⁹ it is difficult to arrive at a uniform definition. Ships used for the processing of fish (so-called ‘klondykers’) would fall under the rather narrow definition in Article I(a) 1993 Compliance Agreement either pursuant to “fishing operations” or to “mother ships”. And even though ships used for the transshipment of fish seem at first sight not covered by this definition, the Preamble to the 1993 FAO Compliance Agreement explicitly mentions that flag State duties extend to such vessels.¹¹⁰ Of some relevance is also that at least one regional fisheries mechanism subjects ships used for the transshipment of fish to the ALC requirement, albeit on an *inter se* basis only.¹¹¹

¹⁰⁵ The Guinean regulatory approach scrutinized in the *Saiga* Cases (*infra* notes 116 and 121) before the ITLOS did in fact *also* prohibit licensed fishing vessels from receiving fuel (Art. 4 Law L/94/007 of Guinea, cited in the *Saiga (Merits)* Case, Judgment, para. 112; *infra* note 116). Judge Warioba, in his Dissenting Opinion in the *Saiga (Merits)* Case, even holds that Art. 62(4)(a and h) LOSC would allow regulation for customs (smuggling) purposes (see para. 76). Note that Art. 111(4) LOSC also envisages that enforcement action can be taken against a mother ship.

¹⁰⁶ See the discussion on abuse of rights in Section 4.4.1.

¹⁰⁷ For “operations” see, for example, S. 1.3 and Art. 8; for “activities” see, for example, Ss. 6.11, 6.15 and 7.5.2. Note that S. 8.1.4 refers to “and related activities”.

¹⁰⁸ For “operations” see, for example, the Preamble and Arts. 10(c), 16(2), and 17(2); for “activities” see, for example, Arts. 5(j), 6(3)(c) and 17(3).

¹⁰⁹ See, for example, Arts. 1 and 3 1995 FAO Code of Conduct.

¹¹⁰ W. Edeson, *Towards Long-term Sustainable Use: Some Recent Developments in the Legal Regime of Fisheries*, in: ‘International Law and Sustainable Development. Past Achievements and Future Challenges’, A. Boyle and D. Freestone (eds.), Oxford, Oxford University Press, 1999, pp. 165-203, at p. 171 observes that the definition of ‘fishing vessels’ proved to be rather contentious during the negotiations for the 1993 FAO Compliance Agreement. In his view the definition “excludes support vessels not directly engaged in fishing operations”. On p. 174 he submits that the use of “fishing support vessels” in the 1995 FAO Code of Conduct “stands in contrast to the much more restricted definition” in the 1993 FAO Compliance Agreement.

¹¹¹ Art. 1(d) NEAFC Scheme (see Section 6.3). See also S. 2 Coastal Fisheries Protection Act of Canada (see Section 6.2 for sources).

In the present context, however, the extent of coastal State powers is presumably more relevant than ascertaining the precise scope of application of flag State obligations. Appropriate weight should therefore be given to the distribution of jurisdiction between flag and coastal States in the LOSC. While the LOSC often uses “fishing vessels” or “fishing”¹¹² without offering definitions, it also refers to “fishing activities” in Article 19(2)(i) and simply “vessels” in Article 73; the latter being the central coastal State enforcement provision for fisheries already cited. Consequently, coastal State powers over vessels not engaged in fishing as such should not *a priori* be ruled out.

One possible point of departure for a more thorough examination of the issue is to examine the navigational rights of fishing support vessels. To avoid too much complexity, discussion will be limited to the territorial sea and the EEZ.¹¹³

Persuading support appears to exist for the view that transshipment (of fish) cannot be regarded as an exercise of the right of innocent passage for failure to meet the requirements of passage in Article 18(2) LOSC. Transshipment disqualifies passage as being “continuous and expeditious” and can neither be classified as “incidental to ordinary navigation” or “*force majeure*”. As klondykers are also involved in transshipment they can be treated on the same footing.¹¹⁴ The same applies where an even wider definition of ‘fishing support vessel’ is pursued, *viz.* by including ships that provide support that is essentially unrelated to fishing proper, for example food, water and other goods for the crew or fuel for the vessel. For the purpose of this analysis we will call this activity ‘bunkering’. In conclusion, on the grounds just submitted, both transshipment and bunkering are already disqualified as exercises of innocent passage. This renders it in principle unnecessary to determine the precise meaning of the phrases “any fishing activities” or “any other activity not having a direct bearing on passage” in subparagraphs (i) and (l) of Article 19(2) LOSC respectively.

With respect to the EEZ, the question which must be answered is if transshipment or bunkering is covered by relevant flag State rights. In view of Article 58(1) LOSC, it is clear that only the clauses “freedom of navigation” or “other internationally lawful uses of the sea related to these freedoms, such as those associated with the operation of ships (...)” would be relevant. A positive answer to this question would put such vessels basically under the same regime as foreign fishing vessels without licenses. Unfortunately, the LOSC does not offer definitions for these clauses and no other guidance is readily at hand.¹¹⁵ It will therefore be up to institutions like the International Tribunal for the Law of the Sea (ITLOS)¹¹⁶ to resolve these issues of interpretation.

But even if bunkering or transshipment could not be classified as ‘freedom of navigation’ or ‘uses associated with a ship’s operation’ (further: associated uses), it would still be

¹¹² For “fishing vessels” see, for instance, Arts. 42(1)(c) and 62(4); for “fishing” see, for instance, Art. 62(4).

¹¹³ The situation in archipelagic waters beyond ASLs would, however, be essentially identical to the territorial sea.

¹¹⁴ In addition, the processing of fish on board of klondykers could be regarded as a ‘fishing activity’ under Art. 19(2)(i).

¹¹⁵ Arguably, the regime of innocent passage distinguishes between an element of movement (Art. 18) and activities undertaken during movement (Art. 19(2); see in particular subpara. (g)). However, this distinction is not necessarily the appropriate one for the EEZ.

¹¹⁶ In the *Saiga (Merits) Case (The M/V ‘Saiga’ Case (No. 2) (Saint Vincent and the Grenadines v. Guinea)*, Judgment of 1 July 1999) before the ITLOS, Guinea argued that bunkering cannot be regarded as freedom of navigation or an associated use, but rather as ‘commerce’ or a ‘commercial activity’ (Verbatim Records, ITLOS/PV.99/14, p. 24, English Version; Judgment, para. 124). Judge Zhao, in his Separate Opinion in the *Saiga (Merits) Case*, largely supports the Guinean view. *Contra* Separate Opinion Judge Vukas (para. 17). The Separate Opinion of Judge Anderson refrains from taking a stand but emphasizes that the issue depends on the specific situation in which bunkering takes place. Text of Judgment, Separate and Dissenting Opinions and Verbatim Records available at: <http://www.un.org/Depts/los>. D. Attard, *The Exclusive Economic Zone in International Law*, Oxford, Clarendon Press, 1987, p. 64 submits that due to the lack of guidance in the LOSC, “whether a given activity, such as offshore servicing, is to be considered as a ‘related’ lawful use or not, will depend largely on the coastal State”. *Prima facie*, Attard seems to suggest that coastal States are reserved an interpretative role, but the context in which this phrase is placed renders it rather ambiguous.

necessary to determine if international law provides coastal States with the competence to regulate (including to prohibit) this behaviour. This approach is primarily relevant for the EEZ because within a State's territorial sovereignty restrictions are not to be presumed and no right of innocent passage exists *in casu*. Also, it should be emphasized again that transshipment or bunkering would be regulated for the purpose of fisheries management.¹¹⁷ The broad way in which Article 56(1)(a) LOSC defines a coastal State's sovereign rights in relation to marine living resources would not seem to raise problems for transshipment (and thereby klondykers) as its link with fisheries is evident.¹¹⁸ Support for this exists in state practice in which foreign ships used for the transshipment of fish are also made subject to the ALC requirement.¹¹⁹

The matter of bunkering is more complicated because its link with fisheries is less obvious. This has not stopped some States from regulate bunkering for the purpose of fisheries management.¹²⁰ In the *Saiga (Prompt Release) Case*,¹²¹ the ITLOS concluded that "for the purpose of the present proceedings, the action of Guinea [the prohibition of bunkering] can be seen within the framework of" Article 73 LOSC.¹²² Although this view has been severely criticized directly or indirectly in all its Dissenting Opinions, it falls somewhat short of actually classifying bunkering as falling under a coastal State's "sovereign rights to explore, exploit, conserve and manage the living resources" in its EEZ.¹²³ One indication of the scope of coastal State prescriptive jurisdiction for fisheries purposes is given by the non-exhaustive list of issues which coastal States may regulate under Article 62(4) LOSC. On this issue Vice-President Wolfrum and Judge Yamamoto observed in their Dissenting Opinion in the *Saiga (Prompt Release) Case*:

¹¹⁷ Conversely, the main issue in the *Saiga (Merits) Case* is the exercise of jurisdiction by Guinea which regulates bunkering (mainly, but not necessarily exclusively, of fishing vessels) for fiscal or customs purposes. Jurisdiction was not asserted for the purpose of fisheries management, even though the Judgment of the ITLOS in the *Saiga (Prompt Release) Case* asserted this, if only in the particular context of the prompt release procedure (see *infra* in main text; see also the explicit rejection of this regulatory purpose by Guinea in its Counter-Memorial in the *Saiga (Merits) Case* (paras. 106 and 108)). As the LOSC does not explicitly refer to relevant coastal State rights or jurisdiction in the EEZ, Guinea was (in the *Saiga (Merits) Case*) forced to rely on extensive interpretations of Art. 56(1)(a) and on "the customary principle of the protection of its public interest against grave disadvantages" (the latter based on the reference to "other rules of international law" in Art. 58(3) LOSC; see Verbatim Records, ITLOS/PV.99/15, p. 6 English Versions, remarks by Professor Lagoni, Counsel for Guinea). The ITLOS eventually held that the exercise of jurisdiction for the purpose of customs in the EEZ (beyond the contiguous zone) is not empowered by the LOSC, nor by the "other rules of international law" in Art. 58(3) LOSC (Judgment, paras. 127-136). Judge Warioba, in his Dissenting Opinion, fully supports the Guinean view in all its extremities, even though a distinction between delivering and receiving fuel is not consistently made (paras. 62-91).

¹¹⁸ See also Art. 62(4)(h) LOSC which allows the coastal State to regulate the landing of all or part of the catch in one of its ports. This would implicitly allow the coastal State to take a less onerous measure on transshipment.

¹¹⁹ E.g. Arts. 11 and 28a EC Council Regulation No 2847/93 (consolidated text; see Section 6.2).

¹²⁰ See, for instance, the definition of 'related activities' in S. 1(xlix)(c) 1998 Marine Living Resources Act of South Africa (see Section 6.2) which reads: "refuelling or supplying fishing vessels, selling or supplying fishing equipment or performing any other activity in support of fishing". In addition, 'fishing' is defined in S. 1(xviii)(d) as "any operation in support or in preparation of any activity described in this definition". See also the definition of 'fishing' in S. 2(1) 1983 Fisheries Act of New Zealand (Fisheries Act, No. 14 of 1 October 1983, <http://www.gplegislation.co.nz>) which reads (in part): "and also includes any operation in support of or in preparation for any activities described in this definition". Foreign vessels intending to engage in bunkering within the EEZ of New Zealand must register and apply for a license under S. 57(1) 1983 Fisheries Act (see also S. 60) and could be subject to the ALC requirement. More or less the same situation exists under the 1991 Fisheries Management Act of Australia (see Section 6.2). For the definition of fishing see S. 4 under (e) and the need to have a fishing license under S. 100.

¹²¹ The M/V 'Saiga' Case (Saint Vincent and the Grenadines v. Guinea), Judgment of 4 December 1997, <http://www.un.org/Depts/los>.

¹²² Para. 71.

¹²³ Art. 73(1) LOSC. Note that what the ITLOS defines in para. 56 of its Judgment as the question which must be considered before the application for the Art. 292 procedure is admissible, comes far closer to attributing bunkering as belonging under the coastal State's sovereign rights under Art. 73. See also the Dissenting Opinions of President Mensah, para. 21, and of Vice-President Wolfrum and Judge Yamamoto, para. 20.

Although this list is not meant to be fully comprehensive, it gives no indication that the competences of the coastal State concerning fishing might encompass activities of merchant ships, associated with the freedom of navigation, for the sole reason that they service fishing vessels.¹²⁴

An important consideration in support of this view would seem to be that the obligation to comply with these coastal State laws and regulations in the *chapeau* of subparagraph (4), is only directed at “[n]ationals of other States *fishing*” (emphasis added). And even though the LOSC does not define this term, it has at any rate not opted for ‘fishing activities’, like in Article 19(2)(i). On the other hand, while it cannot be denied that the list in Article 62(4) does not refer to services rendered to fishing vessels, this is not necessarily conclusive in light of its non-exhaustive character. Moreover, Vice-President Wolfrum and Judge Yamamoto’s view is linked to the classification of bunkering as being “associated with the freedom of navigation”, which is disputable. Finally, this view cannot be isolated from the context of the *Saiga* Cases, which is jurisdiction for fiscal or customs purposes. It is also for that reason that in giving its Judgment in the *Saiga (Merits)* Case, the ITLOS did not issue an *obiter dictum* to resolve the controversy.¹²⁵

If bunkering cannot be regarded as an activity which is an exercise of freedom of navigation or an associated use, and is not covered by the coastal State’s jurisdiction under the LOSC either, the issue becomes one of so-called ‘residual rights’. To address this situation, Article 59 LOSC observes:

In cases where this Convention does not attribute rights or jurisdiction to the coastal State or to other States within the exclusive economic zone, and a conflict arises between the interests of the coastal State and any other State or States, the conflict should be resolved on the basis of equity and in the light of all the relevant circumstances, taking into account the respective importance of the interests involved to the parties as well as to the international community as a whole.

One way of resolving such a conflict would be through an international tribunal like the ITLOS. Guidance on the possible outcome of such a conflict is given by the leading commentary on the LOSC:

Given the functional nature of the exclusive economic zone, where economic interests are the principal concern this formula would normally favor the coastal State. Where conflicts arise on issues not involving the exploration for and exploitation of resources, the formula would tend to favor the interests of other States or of the international community as a whole.¹²⁶

If this view would be adhered to, coastal States would certainly be granted jurisdiction to regulate bunkering for the purpose of fisheries management.¹²⁷

¹²⁴ Para. 22.

¹²⁵ Judgment, paras. 137-138. If only because according to the minority in the *Saiga (Prompt Release)* Case, that Judgment already contained too many *obiter dictums*. See also the observations by Judge Anderson in his Separate Opinion in the *Saiga (Merits)* Case (under “Arrest of the *Saiga*”).

¹²⁶ Nandan and Rosenne 1993, *supra* note 104, at p. 569.

¹²⁷ See also the Separate Opinions in the *Saiga (Merits)* Case of Judges Vukas (para. 21) and Laing (paras. 55-56). Another interesting example is the regulation of anchoring beyond the territorial sea, by the United States in the Flower Garden Banks National Marine Sanctuary, which is around 115 nm from its coasts (15 *Code of Federal Regulations* § 922.122(2)). This raises a number of questions, for example if anchoring is to be regarded as pollution in the sense of Art. 1(4) LOSC, and would thus have to be considered in the framework of Art. 211(5) LOSC and the concept of ‘generally accepted’. The United States, however, argues that regulatory action serves the purpose of resource protection and should be dealt with in the light of Arts. 59 and 78 LOSC (see also Molenaar 1998, *supra* note 43, at pp. 417-418).

4.3.1.4 General Limits to Prescription

Even though coastal States are, based on either sovereignty or sovereign rights, thus expressly permitted to impose terms and conditions on foreign vessels that wish to fish in their waters or on their continental shelf, this regulatory competence cannot but have its limits as well. In addition to the more general principle of abuse of rights already mentioned, a limit is constituted by behavior occurring prior to entering the maritime zones of the coastal State. As examples could be mentioned discharge or fishing violations¹²⁸ or, more directly relevant to this discussion, having the ALC switched on well in advance to entry.¹²⁹

It is submitted that coastal State prescription cannot extend to prior behavior unless international law recognizes the existence of a sufficiently close or substantial connection with the coastal State.¹³⁰ Such a basis of jurisdiction should be applicable between the States involved. This could be a conventional norm or one which is based on customary international law, for example under the effects or impact doctrine.¹³¹ With regard to the requirement that ALCs are to be switched on well in advance to entering a coastal State's maritime zones, current international law does not seem to recognize such a basis¹³² and the effects or impact doctrine would not seem suitable to such cases. The same arguments would apply, *mutatis mutandis*, to a requirement to have ALCs switched on for a considerable period of time after leaving a coastal State's maritime zones.

Under these circumstances, therefore, the right to impose license-conditions is the only basis of jurisdiction. Arguably, this basis is in principle insufficient and would amount to an abuse of rights on account of the absence of necessity. However, were it just a matter of a relatively short period of time or a short distance before or after entry in order to prevent 'border-hopping', the absence of necessity would be much harder to prove.¹³³

In addition to having to be in compliance with the more specific international norms just discussed, coastal State laws and regulations should also observe the principle of non-discrimination. No relevant differences should therefore exist between foreign ships of different nationality.¹³⁴ A related issue is whether or not the principle of national treatment applies, *viz.* the prohibition to substantially differentiate between regulations imposed on national ships (acting as a flag State) and foreign ships that fish in the same area.¹³⁵ It is

¹²⁸ On discharge and fishing violations see Section 4.4.2.

¹²⁹ See South Africa in Section 6.2. Not meant here are requirements to comply with certain CDEM standards, which is dealt with under port State jurisdiction in Section 4.4.2.

¹³⁰ See, for example, the Norwegian statement at the 17th Meeting of CCAMLR (1998), which expressed concern over the undermining of flag State jurisdiction and advocated caution with respect to giving laws extra-territorial application (CCAMLR-XVII, para. 5.8).

¹³¹ Under this doctrine, a State exercises jurisdiction over extra-territorial acts that have 'significant effects' within its territory (see Molenaar 1998, *supra* note 43, at pp. 81-83).

¹³² Noteworthy in this context is the recent development within the International Maritime Organization (IMO) where mandatory ship reporting systems which apply beyond the territorial sea can be adopted by IMO's Maritime Safety Committee (MSC). Adoption by the MSC thus provides the basis in international law (see Regulation V/8-1 SOLAS 74 (International Convention for the Safety of Life at Sea, London, 1 November 1974, as amended. Entry into force on 25 May 1980), adopted by IMO Res. MSC.31(63) and entered into force on 1 January 1996).

¹³³ Van Dyke 1995, *supra* note 90, at p. 226 suggests that coastal States are able to impose a much wider array of conditions for access to their EEZs, such as "compliance with non-discriminatory and consistent management regulations in the areas outside the EEZ". Norway, for example, may deny an application for a license to fish in its maritime zones if the vessel or the vessel's owner has taken part in unregulated fishing on the high seas on a fish stock which is subject to regulation in Norway's maritime zones or if this would contravene regulatory measures laid down by RFMMs (CCAMLR-VIII, para. 5.18 (advance copy), and the relevant Norwegian Working Paper, SCOI 99/19). However, this approach was apparently rejected by the Northwest Atlantic Fisheries Organization (NAFO; see comments by the EC in CCAMLR-XVIII/25, para. 2.44).

¹³⁴ See, for example, Arts. 24(1)(b), 42(2), 54, and 119(3) LOSC.

¹³⁵ The LOSC does not contain a directly relevant principle of national treatment, except for Art. 227 which applies basically exclusively to Part XII on the Protection and Preservation of the Marine Environment (as Art. 227 uses "against", it is better to speak of national treatment instead of non-discrimination, which concerns essentially differences *between* foreign ships).

submitted that as a corollary to the coastal State's competence to deny foreign vessels access to its EEZ altogether,¹³⁶ a less onerous use of its powers by ensuring more favorable conditions for the coastal State's own ships, would *a fortiori* be possible.¹³⁷ However, even in the absence of a legally binding and applicable principle of national treatment, it is certainly not illusory that coastal State regulations are regarded as unfair and lead to responses by other States. This could for instance occur in the form of special conditions being imposed on that coastal State's fishing ships or through (trade) sanctions imposed directly on that State.

Another issue is that of a coastal State's discretion in determining the type of satellite system (e.g. Inmarsat or Argos) or ALC that foreign ships operating in its maritime zones should use. This is understandably a concern for flag States as they are eager to avoid a situation in which their vessels have to install more than one ALC if they wish to operate in several coastal States. Although the trade-related aspects cannot be addressed here, a choice for a preferred VMS would seem to be within a coastal State's discretion. On the other hand, it would generally be unreasonable and also unnecessary to accept only one type of ALC, as long as its performance standards are satisfactory to the coastal State.¹³⁸ Coastal States are at any rate urged to cooperate with flag States to minimize duplication. Hopefully, developments in technology will soon enable the use of a single ALC for more than one satellite system or a VMS using more than one satellite system.¹³⁹

Something which should still be addressed is the extent to which coastal States that determine terms and conditions for access are likely to observe the international legal restraints that have been identified. A key-factor could be the world-wide growing demand for access to fish stocks coupled to constantly shrinking catches. Under such circumstances coastal States have considerable leverage and flag States will be anxious in emphasizing conflict with international law as this might risk denial of access altogether. In case access agreements are negotiated directly with foreign fishing operators, the willingness to compromise in order to secure access may be even stronger, *inter alia* due to the absence of concern on the impact of their behaviour on the formation of customary international law.¹⁴⁰

4.3.2 Enforcement

In taking enforcement action against foreign ships, a coastal State has to take account of applicable rights of navigation. While ships of all nations enjoy under Articles 17 and 52(1) LOSC a right of innocent passage through the territorial sea and archipelagic waters, they lose this right if they engage in unauthorized fishing.¹⁴¹ This loss gives the coastal State in

¹³⁶ Although third States would pursuant to Art. 62(2) LOSC in principle have access to a surplus of the TAC in the EEZ, the relevant factors which the coastal State is obliged to take into account under para. (3) of the same provision, would easily enable it to deny access altogether. See also Art. 297(3)(b).

¹³⁷ As Section 6.2 indicates, for example, Australia, Canada and the United States deny access to foreign flagged vessels altogether. On the other hand, New Zealand and South Africa impose the requirement to install ALCs on all (licensed) foreign vessels, while only certain national vessels are covered.

¹³⁸ State practice confirms this (see the conclusions in Section 6.4).

¹³⁹ Argos has offered the latter option to the FFA Member States.

¹⁴⁰ A good example is that of several fishing vessels from the R.O.C. (Taiwan) that faced steep penalties for violations committed in the maritime zones of the United States. They therefore decided to accept the United States offer for lower penalties if they would have ALCs installed and switched on anywhere and at all times (information kindly obtained from Mr. P. Ortiz (NOAA)).

¹⁴¹ Worth noting is that the 1958 Convention on the Territorial Sea and the Contiguous Zone (TSC; Geneva, 29 April 1958. In force 10 September 1964, 526 *United Nations Treaty Series* 205) provides in Art. 14(5): "Passage of foreign fishing vessels shall not be considered innocent if they do not observe such laws and regulations as the coastal State may make and publish in order to prevent these vessels from fishing in the territorial sea." In the view of two commentators, "Such laws could deal not only with actual fishing but also with, for example, storage of nets while the vessel was in transit" (Churchill and Lowe 1999, *supra* note 63, at p. 84). During the Third United Nations Conference on the Law of the Sea (UNCLOS III) a similar

principle unlimited enforcement powers, subject to relevant principles of international law, such as necessity and proportionality.¹⁴²

Even if a fishing vessel is not caught in the act of unauthorized fishing in the territorial sea or archipelagic waters, the coastal State is allowed to take certain enforcement measures. Boarding could for instance be undertaken to verify if the ALC is functioning properly. Unlike Article 73 LOSC in relation to the EEZ, the LOSC does not explicitly refer to such powers over fishing in the territorial sea or archipelagic waters. However, similar powers to those in the EEZ would *a fortiori* be available in these areas as the coastal State has sovereignty and not 'merely' relevant sovereign rights.¹⁴³ Article 73 provides that:

The coastal State may, in the exercise of its sovereign rights to explore, exploit, conserve and manage the living resources in the exclusive economic zone, take such measures, including boarding, inspection, arrest and judicial proceedings, as may be necessary to ensure compliance with the laws and regulations adopted by it in conformity with this Convention.

Such powers can therefore in principle be used against fishing vessels exercising the right of innocent passage in the territorial sea and archipelagic waters or the freedom of navigation in the EEZ. Also, both licensed and unlicensed foreign vessels can be targeted, whether or not they are engaged in fishing. Decisive for the lawfulness of the enforcement action is if the coastal State has taken proper account of the applicable rights and freedoms of navigation. The LOSC does not provide much guidance on that issue. All it in fact says is that innocent passage should not be unreasonably hampered and that the exercise of freedom of navigation in the EEZ should not be unnecessarily interfered with.¹⁴⁴ Unlike the respective provisions related to vessel-source pollution,¹⁴⁵ no mention is made of a requirement that enforcement cannot be undertaken unless certain evidence exists that a violation has taken place.¹⁴⁶ Ultimately, however, if coastal States fail to meet these tests, they run the risk of being held liable for damage caused. With respect to foreign fishing vessels authorized to fish, special provisions on enforcement could of course be included in their licenses, thereby avoiding liability (in certain cases) from occurring.¹⁴⁷

provision was included in proposals for Art. 19, but never made it to the final text (see Nandan and Rosenne 1993, *supra* note 104, at pp. 164-183). Thus, although coastal States may prescribe that a vessel stows its nets while in lateral passage, a violation of such a regulation does not render passage non-innocent (see, for instance, S. 49(1) 1998 Marine Living Resources Act of South Africa (see Section 6.2)). The newly agreed situation under the LOSC also implies that the non-stowage of fishing nets cannot be interpreted as a "fishing activity" within the meaning of Art. 19(2)(i). However, as will become clear from the ensuing discussion, this does not prevent coastal States from taking appropriate enforcement measures.

¹⁴² Art. 25(1) LOSC allows the coastal State to "take the necessary steps in its territorial sea to prevent passage which is not innocent." While 'no force strategies' are often promoted, this does not prejudice a State's right to take measures that involve the use of force. See also the observations by the ITLOS on the use of force in the *Saiga (Merits)* Case, which basically reaffirm the substance of Art. 22(1)(f) 1995 Fish Stocks Agreement (Judgement, para. 156). See also the Chinese statement upon signature of the 1995 Fish Stocks Agreement (<http://www.un.org/Depts/los>).

¹⁴³ Art. 2(1) LOSC. See also Arts. 21(1)(e) and 27 (note in particular paras. (1)(a) and (5)).

¹⁴⁴ Arts. 24(1), 56(2) and 58(1) LOSC. The term 'unreasonably' is used to differentiate because all enforcement hampers in fact innocent passage (see Molenaar 1998, *supra* note 43, at p. 245; note that Art. 232 LOSC uses the qualification 'reasonably' in relation to the prevention, reduction and control of marine pollution). The qualification 'unnecessarily' is drawn from Art. 73(1). The words "should not" in Art. 27(1) are widely regarded as denoting something less than a full obligation under international law, being dependent on the comity and good will of the coastal State.

¹⁴⁵ See, for example, Art. 220(2) LOSC.

¹⁴⁶ However, Nandan and Rosenne 1993, *supra* note 104, at p. 565 submit that fishing vessels with their gear stowed can only be subjected to visual inspection to check that they are not engaged in fishing. Note that Art. 21(1) 1995 Fish Stocks Agreement does not require 'clear grounds' before boarding and inspection but in para. (5) only if further enforcement steps are being taken. But see safeguards in para. (10). However, para. (14) requires 'clear grounds' in a different situation. The similarity presents itself with the practice of the 'initial control' under regional memoranda of understanding (MOUs) on port State control, for example the Paris MOU (Memorandum of Understanding on Port State Control, Paris, 26 January 1982. In effect 1 July 1982, <http://www.parismou.org>; see S. 3.6.2).

¹⁴⁷ See Art. 62(4)(k) LOSC. Again, coastal States should take account of the general limits to prescription

Coastal State enforcement powers in areas subject to the regimes of transit and ASLs passage are not treated very straightforward in the LOSC. With respect to fishing vessels engaged in unauthorized fishing it has already been argued that they cannot claim to be in 'normal mode'.¹⁴⁸ Consequently, unauthorized fishing is classified as what Article 38(3) defines "an activity which is not an exercise of the right of transit [or ASLs] passage" and becomes subject to "the other applicable provisions" of the LOSC.¹⁴⁹ Arguably, such vessels should be treated on the same footing as vessels in non-innocent passage.

By applying for licenses to fish in areas subject to transit or ASLs passage, foreign fishing vessels would seem to consent in advance to be subject to the same enforcement powers as they would be in an area subject to innocent passage. A more difficult question is whether foreign fishing vessels without licenses which are not engaged in fishing can be subjected to enforcement action. Neither Part III nor Part IV contains a provision which explicitly recognizes strait and archipelagic State enforcement powers, other than Article 38(3). Article 44 (and Article 54 by cross-reference) explicitly stipulates that transit and ASLs passage shall not be hampered or suspended. *Prima facie*, the prescriptive powers "with respect to fishing vessels, the prevention of fishing, including the stowage of fishing gear" under Article 42(1)(c) would presume the existence of enforcement powers. However, this would mean that subparagraphs (a) and (b) in relation to the safety of navigation and vessel-source pollution could be approached in a similar fashion. Quite contrary to such an interpretation, Article 233 has been explicitly incorporated to grant strait States limited enforcement powers. As a provision linked to Article 42(1)(c) has not been included in the LOSC, no related enforcement powers can be presumed. Ignoring this conclusion would lead to the erosion of the special character of the regimes of transit and ASLs passage.

Another enforcement option is included in Article 111 LOSC, which gives coastal States the right of hot pursuit when a foreign ship has violated their laws and regulations. Finally, in addition to enforcement at sea in relation to violations committed in their maritime zones, coastal States may of course also take the less onerous decision to take enforcement measures while the foreign fishing vessel has voluntarily called at one of their ports or anchorages.

4.4 Port State Approaches

As ports lie commonly wholly within a State's territory¹⁵⁰ and fall on that account under its territorial sovereignty, general international law acknowledges in principle full coastal (port) State jurisdiction within ports. This allows a port State not only to deny foreign (fishing) vessels in principle access to port but also to prescribe non-discriminatory laws and regulations that determine conditions for the entry into its ports.¹⁵¹ While it could be argued that State practice indicates that ports are commonly open, this does not imply the existence of a legal right of access to ports under general international law. Access cannot, however, be denied under all circumstances. While ships in distress should in most cases be given

discussed in Section 4.3.1.4.

¹⁴⁸ See text accompanying note 85.

¹⁴⁹ Part IV on Archipelagic States does not explicitly contain a similar provision but for several reasons it should be presumed to apply (*cf.* Molenaar 1998, *supra* note 43, at pp. 341-342).

¹⁵⁰ See Arts. 11, 12 and 121(1) LOSC.

¹⁵¹ Cf. A.V. Lowe, *The Right of Entry into Maritime Ports in International Law*, 14 *San Diego Law Review* 597-622 (1977), p. 608. G. Plant, *Navigation Regime in the Turkish Straits for Merchant Ships in Peacetime*, 20 *Marine Policy* 15-27 (1996), at p. 17 speaks in this context of jurisdiction based on the 'destination principle'. Australia has used its right to refuse entry in its ports to Japanese vessels as a retaliatory measure against the failure to reach agreement in the context of the Southern Bluefin Tuna fishery (see Separate Opinion by Judges Yamamoto and Park in the *Southern Bluefin Tuna (Provisional Measures)* Cases (*supra* note 23).

access to ports, there are circumstances in which the port (or coastal) State's interests override those of the ship.¹⁵²

Article 25(2) LOSC confirms the customary port State right to prescribe conditions for admission into ports and to take the necessary steps to prevent the breach of these conditions.¹⁵³ Nevertheless, limitations on port State jurisdiction may arise from bilateral or multilateral treaties relevant to access to ports, if it concerns matters essentially internal to a vessel, or from general international law.

4.4.1 Prescription

The issue which needs to be addressed here is the extent of port State powers to prescribe conditions for the entry into port in the form of CDEM standards, *viz.* ALCs. This would be relevant for foreign fishing vessels not authorized to fish in that State's maritime zones, but that nevertheless want to call in one of its ports, for instance for the purpose of landing catch.¹⁵⁴ A crucial consideration is that the obligation incorporated in Article 21(2) LOSC not to prescribe CDEM standards other than those that have become generally accepted, applies only to ships in lateral passage. This does therefore not constitute a departure from general international law and Article 25(2) LOSC.¹⁵⁵

¹⁵² See Molenaar 1998, *supra* note 43, at p. 101, n. 125 who discusses so-called 'leper ships'.

¹⁵³ See also Art. 211(3) LOSC, which essentially reaffirms Art. 25(2) in the area of the prevention, reduction and control of vessel-source marine pollution.

¹⁵⁴ Under S. 102 1991 Fisheries Management Act of Australia (see Section 6.2), foreign fishing vessels not authorized to fish in the Australian EEZ need a permit to enter into an Australian port. Obtaining a port permit can, under S. 94(5), be made subject to certain conditions. These powers were used to require certain fishing vessels registered in New Zealand to have ALCs on board and switched on as a condition for entry into port (information obtained from M. Sachse and J. Harford, AFMA). In the framework of CCAMLR, Australia also proposed to require non-Contracting Party vessels to install ALCs as a condition for landing or transshipping catch in port (CCAMLR-XVII, paras. 5.65-5.69 and Annex 5, paras. 2.68-2.70; see also the strong objections by Chile in para. 5.69; text of Report and Conservation Measures available at <http://www.ccamlr.org>). CCAMLR Conservation Measure 118/XVII entitled 'Scheme to Promote Compliance by Non-Contracting Party Vessels with CCAMLR Conservation Measures' was ultimately amended to read in para. (5) that:

"Landing and transshipments of all fish from a non-Contracting Party vessel, which has been inspected pursuant to paragraph 4, shall be prohibited in all Contracting Party ports if such inspection reveals that the vessel has on board species subject to CCAMLR Conservation Measures, unless the vessel establishes that the fish were caught outside the Convention Area or in compliance with all relevant CCAMLR Conservation Measures and requirements under the Convention."

The evidence produced by the vessel could include information from a VMS (see para. (4) of Cons. Meas. 118/XVII). For example, South Africa requires that fishing vessels with certain species on board (including Patagonian Toothfish and Orange Roughy) are in possession of or apply for a permit upon entry into one of South Africa's ports. A condition of such a permit is that the authorities need to be satisfied that the fish concerned have not been illegally taken in the maritime zones of South Africa or another State. Sufficient is a declaration of catch by another coastal State or the fact that the vessel uses an ALC or an observer under South African control. Otherwise South Africa reserves the right to refuse the vessel future entry except for *force majeure* (Annex 12 of Regulation R. 1111 of 2 September 1998 (under the Marine Living Resources Act 1998 (see Section 6.2); information kindly obtained from Mr. D. Miller). See also the South African statements in CCAMLR-XVII, para. 5.11 which reveal a strong commitment to exercise port State jurisdiction.

¹⁵⁵ However, the New Zealand Court of Appeal in the *Sellers v. Maritime Safety Inspector (Sellers)* Case (Case No. CA104/98, Judgment of 5 November 1998) concludes that "a port state has no general power to unilaterally impose its own requirements on foreign ships relating to their construction, their safety and other equipment and their crewing if the requirements are to have an effect on the high seas. Any requirements cannot go beyond those generally accepted, especially in the maritime conventions and regulations" (at p. 17; see also J.S. Davidson, *Freedom of Navigation on the High Seas: Sellers v. Maritime Safety Inspector*, 14 International Journal of Marine and Coastal Law 435-439 (1999)). Cf. D.H. Anderson, *Port States and Environmental Protection*, in Boyle and Freestone 1999, *supra* note 110, pp. 325-344, who argues, *inter alia*, on p. 344 that "[t]he prescription of standards must remain an international task". In his view, the policy of restraint exercised by States generally, including through arrangements such as the Paris MOU (*supra* note 146), makes unilateral approaches increasingly harder to justify.

As was already observed in Section 4.3.1.4, requiring compliance with a CDEM standard has extra-territorial effects. These extra-territorial effects should in principle be regarded as incidental rather than the very object of these conditions, unless of course the opposite is proven.¹⁵⁶ This is not to say that international law imposes no restraints on the port State.¹⁵⁷ One such restraint is couched in the obligation that the exercise of jurisdiction, rights or freedoms shall not constitute an abuse of rights.¹⁵⁸ The following observations by Lauterpacht help to clarify the meaning of this principle:

As legal rights are conferred by the community, the latter cannot countenance their anti-social use by individuals; that the exercise of a hitherto legal right becomes unlawful when it degenerates into an abuse of rights; and that there is such an abuse of rights each time the general interest of the community is injuriously affected as the result of the sacrifice of an important social or individual interest to a less important, though hitherto legally recognized, individual right.¹⁵⁹

In acknowledging that every right has its limitations, the notion of abuse of rights involves in many instances the balancing of conflicting rights. This approach was, *inter alia*, pursued in the *North Atlantic Fisheries Arbitration*.¹⁶⁰ Here the Permanent Court of Arbitration observed with regard to the right of Great Britain to legislate for the protection and preservation of fisheries that:

Regulations which are (1) appropriate or necessary for the protection and preservation of such fisheries, or (2) desirable or necessary on grounds of public order and morals without unnecessarily interfering with the fishery itself, and in both cases equitable and fair as between local and American fishermen, and not so framed as to give unfairly an advantage to the former over the latter class, are not inconsistent with the obligation to execute the treaty in good faith and are therefore reasonable and not in violation of the treaty.¹⁶¹

Applying these considerations to the requirement to install ALCs as a condition for entry into port, involves difficult assessments of elements such as appropriateness, necessity, or desirability. Arguably, the element of national treatment would be less problematic, as it is not fully applicable in relation to fisheries management in areas under national jurisdiction.¹⁶² Nevertheless, if this requirement is exclusively imposed for the purpose of fisheries management, this would arguably indicate a presumption of good faith and would make it harder to prove an abuse of rights.

But even if it would be permitted to formulate the fitting of ALCs as a condition of entry into port, this would be useless if not linked to an obligation to have it also switched on to allow the transmission of information. This complementary obligation cannot convincingly be regarded as a CDEM standard itself or as being part and parcel of it. Conversely, it should be regarded as independent behavior. As the analysis in Section 4.3.1.4 already revealed, general international law is extremely reluctant in accepting jurisdiction over prior behaviour.

¹⁵⁶ See *The International Association of Independent Tanker Owners v. Lowry (or Locke), et al. (Intertanko) Case* (United States District Court, Western District of Washington at Seattle, Case No. C95-1096C, Order of 8 November 1996, 947 F. Supp. 1484), at p. 32.

¹⁵⁷ However, E.J. Molenaar, *Residual Jurisdiction under IMO Regulatory Conventions*, in: 'Competing Norms in the Law of Marine Environmental Protection', H. Ringbom (ed.), London/The Hague/Boston, Kluwer Law International, 1997, pp. 201-216, even considers that the fact that a State is Party to IMO Conventions, does not necessarily restrict its exercise of port State jurisdiction.

¹⁵⁸ See Art. 300 LOSC.

¹⁵⁹ H. Lauterpacht, *The Function of Law in the International Community*, Oxford, Clarendon Press, 1933, p. 286.

¹⁶⁰ *North Atlantic Coast Fisheries Arbitration (Great Britain v. the United States of America)*, Permanent Court of Arbitration, 1910, J.B. Scott, *The Hague Court Reports*, Vol. 1, p. 141.

¹⁶¹ *Ibid.*, p. 171.

¹⁶² See Section 4.3.1.4. Conversely, the citation from the *North Atlantic Fisheries Arbitration* deals not with general international law but with bilateral treaty-relations.

From a port State perspective, the requirement to have the ALC switched on in its (coastal State's) maritime zones would be essentially similar to regulating behaviour that occurs beyond its maritime zones. This conclusion is inevitable when it is assumed, as Section 4.3.1.2 does, that foreign vessels without licenses cannot be required to install ALCs and have them switched on while they navigate through a coastal State's maritime zones.

Although ships subject themselves to port State jurisdiction by their voluntary presence in port, such jurisdiction cannot extend to prior behavior unless international law recognizes the existence of a sufficiently close or substantial connection with the port State. Although this issue could be pursued from the perspective of prescription, the relevant international instruments treat it commonly in the sphere of enforcement. Discussion is therefore deferred to the next Section.

4.4.2 Enforcement

Port State enforcement is always in-port enforcement. It is based on the vessel's voluntary presence in port and can only extend to issues for which international law authorizes the port State to prescribe.¹⁶³ While enforcement to verify compliance with lawfully prescribed CDEM standards is not controversial, quite the opposite is true with respect to behaviour that occurred before a vessel enters the maritime zones of the coastal State. Nevertheless, international law provides some possibilities to exercise enforcement over prior behaviour, for example with respect to illegal discharges.¹⁶⁴

The global instruments on fisheries that were adopted in the 1990s all address port State enforcement. Article V(2) 1993 FAO Compliance Agreement contains an obligation for port States to notify the flag State if it has "reasonable grounds for believing" that a fishing vessel voluntarily in their port "has been used for an activity that undermines the effectiveness of international conservation and management measures".¹⁶⁵ No mention is made of the power to conduct inspections. However, as this would be necessary to obtain "reasonable grounds for believing", this power is to be inferred (see further *infra*). It is important to note that the obligation is limited to notifying the flag State and does not extend to the inspection,¹⁶⁶ and is in any case only applicable between States Parties to the 1993 FAO Compliance Agreement.

Section 8.3 1995 FAO Code of Conduct does not give the port State more powers in comparison with the 1993 FAO Compliance Agreement, nor does it impose more (stringent) obligations. Undoubtedly due to its voluntary nature, it calls upon port States to take measures but emphasizes that these should be "in accordance with international law, including applicable international agreements or arrangements", or upon the request of the flag State.

The 1995 Fish Stocks Agreement, which is of course in principle only concerned with straddling and highly migratory stocks, deals with port State enforcement in Article 23, which provides:

¹⁶³ A case of non-voluntary presence exists where a vessel has violated coastal State enactments while in its maritime zones and has subsequently been directed to one of that coastal State's ports. This is therefore more properly dealt with under coastal State enforcement.

¹⁶⁴ Art. 218 LOSC. See the reference to Art. 218 and the efforts by regional MOUs on port State control in S. 8.3.2 1995 FAO Code of Conduct. Also noteworthy is that the way in which the United States regulates anchoring in certain parts of its EEZ (*supra* note 127) was preferred above formulating it as a condition for the entry into port (*cf.* W.T. Burke, *Changes Made in the Rules of Navigation and Maritime Trade by the 1982 Convention on the Law of the Sea*, in: *The Developing Order of the Oceans*, Proceedings of the Law of the Sea Institute 18th Annual Conference, R.B. Krueger and S.A. Riesenfeld (eds.), San Francisco, 1984 (Honolulu, Law of the Sea Institute, University of Hawaii, 1985), pp. 662-677, at p. 669).

¹⁶⁵ Although this provision does not explicitly mention that these measures are intended to apply to high seas fishing, this can be inferred from the full title of the 1993 FAO Compliance Agreement and from the scope of application in Art. II(1). However, the definition of 'international conservation and management measures' in Art. I(b) does not refer to the high seas.

¹⁶⁶ This is different for regional MOUs on port State control, which contain specified inspection targets.

1. A port State has the right and the duty to take measures, in accordance with international law, to promote the effectiveness of subregional, regional and global conservation and management measures. When taking such measures a port State shall not discriminate in form or in fact against the vessels of any State.

2. A port State may, *inter alia*, inspect documents, fishing gear and catch on board fishing vessels, when such vessels are voluntarily in its ports or at its offshore terminals.

3. States may adopt regulations empowering the relevant national authorities to prohibit landings and transshipments where it has been established that the catch has been taken in a manner which undermines the effectiveness of subregional, regional or global conservation and management measures on the high seas.

4. Nothing in this article affects the exercise by States of their sovereignty over ports in their territory in accordance with international law.

First of all, the fact that port States have both a “right and a duty” to take the measures referred to, is innovatory due to its inclusion in a legally binding instrument. However, if paragraph (2) is to be regarded as innovatory is more difficult to answer. To some extent, this is due to the uncertain meaning of the words “*inter alia*”. Leaving that aside, it seems that, based on its territorial sovereignty, a port State would surely have the right to inspect vessels that wish to call on its ports. Uncertain is if this would also allow the port State to carry out an inspection to verify what happened beyond its maritime zones. The absence of any reference to inspection in Article V(2) 1993 FAO Compliance Agreement (discussed *supra*) suggests this should be answered positively. Moreover, in practice it may be quite difficult to make such a distinction in the inspection phase. It is admitted, however, that the opposite could be argued as well: the fact that the port State would not, in the absence of an explicit basis, be permitted to impose penalties if the inspection reveals illegal behavior, presumably implies that general international law would simply not allow such an inspection.

In case the inspection reveals that “the catch has been taken in a manner which undermines the effectiveness of subregional, regional or global conservation and management measures on the high seas”, paragraph (3) explicitly authorizes the port State to prohibit landings and transshipments. No mention is made of the power to detain or to institute proceedings.¹⁶⁷ Again, it could be argued that a port State’s right to deny entry into port under general international law would include such less intrusive measures as the prohibition of landings and transshipments. However, contrary to such an opinion, it seems that none of these powers could be used in relation to issues for which the port State has no authority to prescribe (under general international law). On the basis of the above, the conclusion would be that the exercise of the general right to prescribe conditions for the entry into port amounts to an abuse of rights if it relates to prior behaviour for which the port State has no explicit legal basis to prescribe.

In spite of the view taken here, due to the high complexity of the issue it is more than likely that varying views on the matter can be expected to persist.¹⁶⁸ A clear indication of the

¹⁶⁷ M. Hayashi, *The 1995 UN Fish Stocks Agreement and the Law of the Sea*, in: ‘Order for the Oceans at the Turn of the Century’, D. Vidas and W. Østrem (eds.), The Hague/London/Boston, Kluwer Law International, 1999, pp. 37-53, at p. 46 mentions that the power to detain did not make it through the negotiation phase. See in this respect the Uruguayan declaration upon signature of the 1995 Fish Stocks Agreement (No. 5). Note that Art. 218 LOSC explicitly allows the institution of proceedings and implicitly the power to detain (*cf.* Molenaar 1998, *supra* note 43, at p. 462). Moreover, S. 4.3, para. 49 Technical Guidelines No. 1 (Fishing Operations) to the 1995 FAO Code of Conduct, seems to allow detention for violations of “international agreements for the conservation and management of living marine resources and protection of the environment” (para. 48(e)(ii)). This could be careless drafting as much of the substance of these paras. is concerned with safety requirements (CDEM standards).

¹⁶⁸ See the practice by Australia and South Africa in note 154. See also Anderson 1999, *supra* note 155, at pp. 338-341 for a discussion of the conflicting views during the negotiations on the 1995 Fish Stocks Agreement. Edson 1999, *supra* note 110, at p. 179 submits that the provisions in the global instruments discussed in the main text “do not have any significant difference in potential application in view of the fact that port States already can do what they want in respect of vessels in their ports (voluntarily or otherwise),

contentious nature of port State enforcement, and implicitly prescription, is paragraph (4) of Article 23 which contains a non-prejudicial clause. Several regional fisheries management mechanisms have adopted the approach taken in Article 23 1995 Fish Stocks Agreement, but also apply it towards vessels flying the flag of a Non-Contracting State without taking account of that State's adherence to the 1995 Fish Stocks Agreement.¹⁶⁹ Moreover, the practice of several States seems to go well beyond even that.¹⁷⁰

5 Satellite Remote Sensing (SRS) and Space Law

Outer space is similar to the high seas in the sense that neither of them can be subjected to the sovereignty of States and are thus *res communis*.¹⁷¹ As will be clarified, this categorization influences the rights and obligations of States towards satellite remote sensing (SRS) considerably. The principal international instrument which governs the rights and obligations of States engaging in activities in outer space is the Space Treaty.¹⁷² The main points of relevance for the purpose of this article are laid down in Articles I and III. Article I recognizes that “[o]uter space (...) shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law” and that “[t]here shall be freedom of scientific investigation in outer space”.

These two freedoms (the freedom of exploration and use, and the freedom of scientific investigation) are subject to Article III, under which States Parties to the Space Treaty “shall carry on activities in the exploration and use of outer space (...) in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international co-operation and understanding.” In other words, these freedoms can only be exercised for ‘peaceful purposes’.¹⁷³ Articles IV and IX further reinforce the overarching objective of the peaceful use of outer space. The issue of ownership, jurisdiction and control is governed by Article

subject only to certain very general limitations imposed by international law or specific limitations derived from treaties”. Cf. P. Örebech, K. Sigurjonsson and T.L. McDorman, *The 1995 United Nations Straddling and Highly Migratory Fish Stocks Agreement: Management, Enforcement and Dispute Settlement*, 13 *International Journal of Marine and Coastal Law* 119-141 (1998), at p. 132. However, M. Hayashi, *The 1995 Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks: Significance for the Law of the Sea Convention*, 29 *Ocean & Coastal Management* 51-69 (1995), at p. 63, treats Art. 23 1995 Fish Stocks Agreement as an innovation modeled on Art. 218 LOSC. Cf. Anderson 1999, *supra* note 155. R. Barston, *United Nations Conference on Straddling and Highly Migratory Fish Stocks*, 19 *Marine Policy* 159-166 (1995), at p. 166 who regards Art. 23 1995 Fish Stocks Agreement as a “misapplication of the port state concept”, would probably also consider it to be innovative.

¹⁶⁹ For example, CCAMLR Conservation Measure 118/XVII (*supra* note 154), in particular paras. (4) and (5), NAFO's ‘Scheme to Promote Compliance by Non-Contracting Party Vessels with the Conservation and Enforcement Measures established by NAFO’ (NAFO/GC Doc. 97/6, <http://www.nafo.ca>; in particular paras. (9) and (10)), and Art. 14 Draft SEAFO (South East Atlantic Fisheries Organization) Convention (5th Meeting). A proposal by the United States at the 4th Meeting to revise Art. 14 would have even allowed the port State to “detain the vessels for such reasonable period of time as necessary for enforcement purposes” (para. (3); see para. (6) for *mutatis mutandis* application to fishing vessels of non-Parties).

¹⁷⁰ The United States Lacey Act (Public Law 97-79, effective 16 November 1981, 16 *United States Code* §§ 3371-3378, in particular § 3372) permits the (in-port) inspection of foreign vessels to verify if fishing has taken place in contravention of other States' enactments, and the imposition of fines and confiscation of the catch if a violation has been ascertained (see Lodge 1997, *supra* note 51, at p. 163). S. 75(2) 1998 Fisheries Management Act of Papua New Guinea appears to take a similar approach. Anderson 1999, *supra* note 155, at pp. 338 and 341 discusses legislation of Iceland and Norway which permits denial of entry in case of undermining of internationally agreed conservation measures committed beyond their maritime zones.

¹⁷¹ See Art. 89 LOSC and Art. II Space Treaty (*infra* note 172).

¹⁷² Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, New York, 19 December 1966. In force 10 October 1967, 61 *American Journal of International Law*, 644 (1967).

¹⁷³ See also Art. IV which deals with military activities, and Art. 88 LOSC which stipulates that “The high seas shall be reserved for peaceful purposes.”

VIII, which basically says that the State who launches an object into outer space shall retain ownership, jurisdiction and control over such object.

Worth observing here is that the Space Treaty does not define the limit between outer space and air space. This is not insignificant as aircraft (or other objects) do not have a right of overflight in the air space above areas which fall under State sovereignty, *viz.* landward of the outer limit of the territorial sea.¹⁷⁴ A suggestion for a sensible limit would be the lowest technically desirable altitude above the earth sufficient to permit free orbit of spacecraft, therefore around 100 (regular) miles.¹⁷⁵

There can be little doubt that SRS involves the 'use of space' in the sense of Article III, even though it is strongly earth-oriented.¹⁷⁶ Apart from the Space Treaty, however, there is to this date no legally binding international instrument specifically relating to SRS. All there is are the Principles on Remote Sensing (SRS Principles), adopted in 1986 by the United Nations General Assembly.¹⁷⁷ These govern SRS undertaken for the limited number of purposes listed in Principle I, one of which is "improving natural resources management".

SRS for the purpose of monitoring compliance with fishery regulations will not quickly raise the issue of third States. A costly undertaking such as this is likely to be limited to the maritime zones of the State(s) paying for it. Even if the satellite would be in orbit above and therefore able to 'sense' the maritime zones of a State not formally participating, the costs would often be prohibitive. This would be quite different if, for instance, SRS would be used to locate fish stocks. For this purpose, the rights of non-participating States are briefly addressed.

Principle IV of the SRS Principles establishes the general rule that SRS shall not be "detrimental" to the sensed States. In addition, some special situations are covered by Principles X and XI, which stipulate that if States participating in remote sensing activities have information relating to natural disasters or other phenomena harmful to the Earth's natural environment, they "shall" disclose or transmit such information to States concerned. Of special relevance is the situation where SRS relates to areas under the jurisdiction of non-participating States. Although some States were in favor of a right to require prior consent, Principle XIII takes a prior consultation approach pursuant to which:

a State carrying out remote sensing of the earth from space shall, upon request, enter into consultation with a State whose territory is sensed in order to make available opportunities for participation and enhance the mutual benefits to be derived therefrom.

This obligation relates only to the "territory" of the other State and excludes therefore maritime zones seaward of the territorial sea. It may be clear from the wording that the sensed State is not in a particularly strong negotiating position. This contrasts sharply with the regime of marine scientific research (MSR) in Part XIII of the LOSC, which recognizes practically exclusive coastal State controls for such research carried out in its maritime zones.¹⁷⁸ Once SRS has been engaged in, with or without the involvement of the 'sensed

¹⁷⁴ See Arts. 2(2), 19, 86 and 87 LOSC. Art. 2(2) provides that a State's sovereignty extends to the air space over its territory (which includes the territorial sea). Arts. 38(2) and 53(3) LOSC contain exceptions by granting a right of overflight over areas subject to transit and ASLs passage.

¹⁷⁵ I. Brownlie, *Principles of Public International Law*, Oxford, Clarendon Press, 4th ed., 1990, p. 268.

¹⁷⁶ Cf. I.H.Ph. Diederiks-Verschoor, *An Introduction to Space Law*, Deventer/Boston, Kluwer Law and Taxation Publishers, 1993, p. 65.

¹⁷⁷ Adopted by Resolution 41/65 on 11 December 1986, UN. Doc. A/Res/41/65 (1987) (unanimously adopted).

¹⁷⁸ P. Birnie, *Law of the Sea and Ocean Resources: Implications for Marine Scientific Research*, 10 International Journal of Marine and Coastal Law 229-251 (1995), at p. 247 observes that Part XIII does not specifically cover or restrict MSR carried out by SRS. At any rate, SRS used for the purpose of monitoring of vessels cannot be categorized under MSR because, in view of Soons' definition of MSR (*supra* note 34), not the marine environment but the vessels are the object. Churchill and Lowe 1999, *supra* note 63, at p. 412 observe that the LOSC provisions on MSR may to some extent become obsolete due to the expected increase in remote sensing.

State', Principle XII provides that with respect to information¹⁷⁹ relating to a State's territory, the 'sensed State' "shall have access (...) on a non-discriminatory basis and on reasonable cost terms". In conclusion, therefore, international law does not substantially restrain States wishing to engage in SRS.

6 Satellite-based VMSs and State Practice

6.1 Introduction

This Section discusses the developments in State practice on the use of satellite-based VMSs for fisheries management. A number of comments to clarify the scope of the discussion are called for. A significant one is that no account is taken of the often widespread use by private companies that seek to improve management,¹⁸⁰ or of States that are still in a process of implementing a satellite-based VMS at the time of writing.¹⁸¹

Section 6.3 deals with six regional fisheries management mechanisms (RFMMs)¹⁸² that have taken steps towards using satellite-based VMSs to manage fisheries in their regulatory areas, *viz.* CCAMLR, FFA, ICCAT, NAFO, NEAFC and the RFMM in the Central Bering Sea.¹⁸³ Moreover, negotiations are currently under way to establish two new RFMMs; one in the South East Atlantic and another in the Central and Western Pacific. Both negotiation-processes have already agreed that some kind of VMS will be used by the future RFMM.¹⁸⁴ As will become clear, their operational status varies considerably. There may be a variety of reasons to which this can be attributed, for example the type of fish stocks. Also highly relevant is the type of cooperation which in its turn depends on factors such as the spatial scope and jurisdictional fragmentation of the regulatory area and the number and type of States participating.

Evidently, the distinction between the practice of States on the one hand, and developments in RFMMs on the other hand, raises red flags. At least part of State practice must logically be aimed at implementing the regulatory decisions taken at the regional level. The emphasis in Section 6.2 will therefore be primarily focussed on additional or complementary initiatives, either on a flag State basis, on a coastal State basis, or on both.¹⁸⁵ The figures of vessels covered are thought to be correct at the moment of writing (January 2000). While comprehensiveness would certainly have been preferable, certain

¹⁷⁹ The terms 'primary data', 'processed data' and 'analyzed information' are defined in Principle I. In essence, they indicate stages in which raw data is transferred into usable information.

¹⁸⁰ SOFIA 1998, *supra* note 29, at Box 16 speaks of "an exponential increase" in recent years.

¹⁸¹ Madagascar is currently considering a satellite-based VMS for shrimp fisheries management (information kindly obtained from Mr. X. Vincent, Oceanic Développement, May 1999). The Seychelles hope to have a satellite-based VMS in operation in 2000. The intention is to develop the system gradually while initially only purse seiners will be targeted (information kindly provided by Mr. P. Michaud, Seychelles Fishing Authority, January 2000).

¹⁸² RFMM is meant to be an overarching term inspired by the distinction between organizations and 'arrangements' in the 1995 Fish Stocks Agreement (e.g. Arts. 8(1) and 9(1)).

¹⁸³ Compared to the others, the FFA has very different characteristics, which have an impact on its qualification as 'arrangement' and 'regulatory area'. For the purpose of this article, however, the FFA is lumped together with the other RFMMs. Practice of FFA Member States is therefore discussed in the context of the regulatory developments undertaken by the FFA. An exception is made for Australia and New Zealand which had already developed a VMS before the FFA undertook action. With respect to fisheries management, the EC is regarded as one State rather than a RFMM (*cf.* Churchill 1987, *supra* note 2, at p. 177). For the purpose of this article at least, the 1998 STR Arrangement between Australia and New Zealand is not regarded as a RFMM (*infra* Section 6.2, under Australia). Finally, a Meeting of the Latin American Organization for the Development of Fisheries (OLDEPESCA) in November 1999, adopted a declaration in which it recognizes the value of satellite-based VMSs for sustainable fisheries management.

¹⁸⁴ See Art. 15(3)(a) SEAFO (South East Atlantic Fisheries Organization) Draft Convention (5th Meeting, October 1999) and Art. 24(8) CWPFO (Central and Western Pacific Fisheries Organization) Draft Convention (5th Session, September 1999).

¹⁸⁵ State practice on port State approaches is referred to in the footnotes in Section 4.4. References to these footnotes have also been made in Section 6.2, for States individually.

information could due to the global approach not be collected or may have been missed.¹⁸⁶ Finally, as the aim is to give readers a general overview, the regulatory initiatives are not discussed in detail. Elements such as ALC-related conditions, penalties, contingency plans in case ALCs do not function and the many other elements referred to in Section 3.3 are included in most, if not all, regulatory instruments.

6.2 States

Argentina

Disposicion No. 1 of 10 January 1997 of the register of the Under-Secretary of Fisheries, requires certain Argentine ships to install an ALC (referred to as 'MONPESAT') on board. Resolution No. 367, of 28 December 1998, by the Secretary of Agriculture, Livestock, Fisheries and Food lays down a number of obligations which these ships have to comply with, *inter alia* that the ALC is to be switched on at all times, except when the ship is in port. Foreign ships authorized to fish in Argentina's maritime zones are also required to have ALCs installed and switched on.¹⁸⁷

Australia¹⁸⁸

Jurisdiction over fisheries in Australia's maritime zones is shared between, on the one hand, the states and territories and, on the other hand, the federal government. On the issue of VMS, both levels use Inmarsat-C and assess for each individual fishery whether VMS is a necessary regulatory tool or not. At the federal level, the requirement to install an ALC is included in the permit conditions of around 280 vessels.¹⁸⁹ While all foreign vessels would also be required to comply with these conditions, at the moment of writing no foreign vessels are authorized to fish in Australia's maritime zones.¹⁹⁰

At the state and territories level, Queensland is currently tracking around 650 vessels, which could increase with another 750.¹⁹¹ Tasmania tracks momentarily around 80 vessels but another 320 could potentially be covered.¹⁹² Western Australia covers 45 vessels, with a

¹⁸⁶ For example, no information could be obtained from Chile, China, Morocco (noted in the FAO VMS Guidelines, *supra* note 10, at p. 3), the Russian Federation, South Korea and Uruguay (see CCAMLR-XVIII, para. 2.15).

¹⁸⁷ Foreign ships authorized to fish fall under a charter-regime. Information kindly provided by Mr. F. Lopez, MONitoreo de PESca SATelital (MONPESAT), INIDEP, Argentina, May/June 1999.

¹⁸⁸ See also the references to Australia in notes 21, 93, 120, 151 and 154.

¹⁸⁹ The main fisheries are: South East Trawl Fishery, the North West Slope/Western Deepwater Fishery, the Bass Strait Central Zone Scallop Fishery and the Northern Prawn Fishery. The authority to impose such a requirement is based on S. 32 1991 Fisheries Management Act (Act No. 162, of 10 November 1991, text available at: http://www.austlii.edu.au/au/legis/cth/consol_act). Australia's ratification of the 1995 Fish Stocks Agreement was accompanied by the Fisheries Legislation Amendment Act (No. 1) 1999 (No. 143, 1999), which allows for the issuing of permits for fishing on the high seas in a similar fashion as within those fisheries within Australia's maritime zones that are regulated at the federal level.

¹⁹⁰ Information kindly provided by Mr. P. Callagher, AFMA, May/June 1999.

¹⁹¹ While the authority to impose ALCs is based on the Fisheries Act 1994 (see also S. 184(5 and 6) on evidentiary provisions), specific management plans contain relevant provisions. For example, the Fisheries (East Coast Trawl) Management Plan 1999 (Ss. 10, 57-65 and 171; S. 10 contains the so-called 'exclusion zone') and the Fisheries (Gulf Of Carpentaria Inshore Fin Fish) Management Plan 1999 (Ss. 68-69 and 94). Legislation available at <http://www.legislation.qld.gov.au/OQPChome.htm>.

¹⁹² While the authority to impose ALCs is based on the Living Marine Resources Management Act 1995, the following statutory rules contain relevant provisions: Fisheries Rules 1996 (Ss. 134A-134C; scallop), Fisheries (Rock Lobster) Rules 1997 (Ss. 69-71), and Fisheries (Giant Crab) Rules 1999 (Ss. 54(2)(a) and 62). Legislation available at <http://www.thelaw.tas.gov.au>. Information partly based on N. Fowler and M. Richardson, *Industry Culture and Vessel Monitoring Systems*, unpublished paper presented at the 1999 Cairns Conference, *supra* note 16.

potential increase of 100.¹⁹³ Finally, South Australia is currently conducting trials with about 40 vessels and Victoria is also contemplating involvement in VMS.

Since several years, Australia and New Zealand cooperate in the management of an orange roughy stock in the South Tasman Rise, which is partly within the Australian EEZ and partly on the high seas.¹⁹⁴ The 1998 Arrangement between the Government of Australia and the Government of New Zealand for the Conservation and Management of Orange Roughy on the South Tasman Rise (1998 STR Arrangement)¹⁹⁵ provides in paragraph 12 that vessels fishing for the stock are to be fitted with ALCs. Although the 1998 STR Arrangement expired in 1998 and could, despite numerous rounds of negotiation up until the moment of writing, not yet be renewed, the vessels involved in this fishery are presumably still subject to the VMS.

Canada¹⁹⁶

After an experimental phase, Canada is presently using an Inmarsat VMS for scallop fisheries within its own maritime zones.¹⁹⁷ Applications for licenses to fish for scallops authorize the use of ALCs in substitution for an on-board observer, provided certain conditions are met.¹⁹⁸ So far only position and identification information is supplied, without exploring other applications of two-way communication.¹⁹⁹ License holders authorize their service provider to forward the data to the FMC in Halifax. Canada takes the approach of examining each fishery individually to determine the cost-effectiveness of a satellite-based VMS. In light of the absence in surplus of TAC, foreign fishing vessels are not likely to obtain a license for scallop fisheries. In fact, except for a few foreign vessels fishing for hake and tuna, this is the same for all other fisheries.²⁰⁰

European Community (EC)²⁰¹

In 1992 the EC decided that EU Member States were to carry out pilot-projects on satellite-based VMSs, which were to be funded by the EC.²⁰² The positive results from the pilot-

¹⁹³ The authority to impose ALCs is based on the Fish Resources Management Act 1994 (see S. 215 on the accuracy of measuring equipment). Specific provisions are incorporated in the Fish Resources Management Regulations (No. 8) 1997 (Regs. 55A-55D) and various management plans, e.g. the Pilbara Fish Trawl and the Northern Demersal Scalefish. For these fisheries, use is made of notifications to commence and cease fishing (for time-access management) and to transit 'Closed Waters'. Entry into Closed Waters without prior notification constitutes an offence. Information kindly provided by R. Casey, Fisheries Western Australia, December 1999.

¹⁹⁴ For Australia, regulatory responsibility lies at the federal level and the particulars of the VMS are therefore similar to other federal VMS activities. For domestic purposes, Australia uses an Australian Fisheries Zone (AFZ), which is not always identical to its EEZ.

¹⁹⁵ Signed on 12 January 1998 and 18 February 1998 respectively. In effect 1 March 1998, expired 28 February 1999.

¹⁹⁶ See also the references to Canada in note 111.

¹⁹⁷ Offshore and Inshore Scallop – Scotia-Fundy Sector. Approximately 30 fishing vessels with sizes above 65 ft. are currently covered, but this may be extended considerably.

¹⁹⁸ The authority to impose license conditions is based on the regulatory powers under S. 43(e.1) Fisheries Act (R.S., c. F-14) while S. 22(1) Fishery (General) Regulations (SOR/93-53, P.C. 1993-186, 4 February, 1993) contains further particulars. All relevant Acts, Orders and Regulations are available at <http://www.ncr.dfo.ca>.

¹⁹⁹ Some preliminary work has been done with video cameras but for various reasons this is not expected to be implemented in the near future.

²⁰⁰ Information kindly supplied by Ms. M. Glaiber, Enforcement Co-ordination, Department of Fisheries and Oceans (DFO), Canada, May 1999.

²⁰¹ See also the references to the EC in notes 58 and 119.

²⁰² Cf. J. Verborgh, *VMS Developments in the European Union*, unpublished paper presented at the 1999 Cairns Conference, *supra* note 16, at p. 2. Currently there are 15 EU Member States: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom. Austria and Luxemburg are land-locked and have not taken any relevant action (cf. Verborgh 1999, this note, at p. 2). France will establish a VMS in summer 2000 in relation to its

projects, which took place in 1994/1995, led to the adoption of Council Regulation No 686/97, of 14 April 1997²⁰³ which amended the principal regulation for the control of the Common Fisheries Policy (CFP): Council Regulation No 2847/93, of 12 October 1993, establishing a control system applicable to the common fisheries policy.²⁰⁴ Further relevant amendments were introduced by Council Regulation No 2846/98, of 17 December 1998.²⁰⁵ Also of paramount significance is Commission Regulation No 1489/97, of 29 July 1997,²⁰⁶ laying down detailed rules for the application of Council Regulation No 2847/93 as regards satellite-based vessel monitoring systems. Finally, tampering with ALCs is covered by Council Regulation No 1447/1999 of 24 June 1999 establishing a list of types of behaviour which seriously infringe the rules of the common fisheries policy.²⁰⁷

As EU Member States have delegated exclusive prescriptive competence in fisheries to the EC level,²⁰⁸ it is in principle not necessary to examine relevant regulatory activity for each individual Member State. Also, EC Regulations do not have to be transferred into national enactments, but in light of the Member States' competence in enforcement, national laws and regulations will often be in place. It has not been possible to investigate these here. Finally, it is also up to each Member State to decide which satellite-system and ALC it uses.

The EC Regulations mentioned above require all Community vessels (those registered in or flying the flag of an EU Member State) exceeding 20 metres between perpendiculars or 24 metres overall length, to install ALCs from 1 January 2000.²⁰⁹ From that date, all third-country fishing vessels of the same dimensions also have to be equipped with ALCs. In the meantime they are to signal their movements to competent authorities.²¹⁰ The standard procedure is that information is transmitted to both the flag State and the coastal State. This applies to Community waters but often also where Community vessels operate in the maritime zones of third States. The EC has concluded bilateral agreements on VMS with Mauritania, Morocco, Norway, the Faroe Islands, the Baltic States, Poland and Russia, which devote ample attention to these aspects.²¹¹

overseas territories and the United Kingdom already has VMS in operation for its South Atlantic Ocean possessions (CCAMLR-XVIII/25, para. 2.15).

²⁰³ *Official Journal* 1997, L 102/1. Consolidated text of EC enactments and treaties at: <http://europa.eu.int/eur-lex/en/index.html>.

²⁰⁴ *Official Journal* 1993, L 261/1. Note that Art. 3 concerns the VMS pilot project.

²⁰⁵ *Official Journal* 1998, L 358/5.

²⁰⁶ *Official Journal* 1997, L 202/18.

²⁰⁷ *Official Journal* 1999, L 167/ 5 (see Annex, under E).

²⁰⁸ See Art. 3(1)(e) EC Treaty (Treaty establishing the European Economic Community, Rome, 25 March 1957. In force 1 January 1958, 298 *United Nations Treaty Series* 11. The EC Treaty has, *inter alia*, been amended by the 1986 Single European Act, the 1992 EU Treaty and the 1997 Amsterdam Treaty. Art. 3(1)(e) refers to the consolidated version; see source *supra* note 203) and the declaration accompanying the EC's instrument of formal confirmation of the LOSC, pursuant to Art. 5(1) Annex IX to the LOSC. The caption "Matters for which the Community has exclusive competence" is immediately followed by the words: "The Community points out that its Member States have transferred competence to it with regard to the conservation and management of sea fishing resources. Hence in this field it is for the Community to adopt the relevant rules and regulations (which are enforced by the Member States) and, within its competence, to enter into external undertakings with third States or competent international organizations. This competence applies to waters under national fisheries jurisdiction and to the high seas. Nevertheless, in respect of measures relating to the exercise of jurisdiction over vessels, flagging and registration of vessels and the enforcement of penal and administrative sanctions, competence rests with the Member States whilst respecting Community law. Community law also provides for administrative sanctions" (<http://www.un.org/Depts/los>).

²⁰⁹ Some Community vessels were already subject to such a requirement (see Art. 3 Council Reg. No 2847/93 (consolidated text)). However, an exception applies to vessels operating exclusively within 12 nm of the baselines of Member States and to vessels which operate at sea for less than 24 hours. By June 1999, about 600 fishing vessels were tracked (Verborgh 1999, *supra* note 202, at p. 7).

²¹⁰ See Art. 28c Council Reg. No 2847/93 (consolidated text). See also the definition of 'third-country fishing vessels' in Art. 28a, which, *inter alia*, includes vessels used for transshipments.

²¹¹ Information partly provided by J. Verborgh (EC Commission). Except for Mauritania and Morocco this are all

Iceland

Due to its involvement in NAFO and NEAFC and bilateral initiatives with Norway (see *infra*), Iceland is in the process of developing a VMS which also applies within its own maritime zones.²¹² Icelandic vessels that fall under the scope of these regional and bilateral agreements are tracked both within and beyond the Icelandic EEZ. In addition, Icelandic vessels fishing for shrimp in special areas in the Icelandic EEZ are to install ALCs. Foreign vessels licensed to operate in the Icelandic EEZ are not subject to VMS, but this is likely to happen within the next few years.²¹³ The VMS makes use of Inmarsat-C, includes automatic location reports and manual catch and activity reports and is expected to be finalized early in 2000.²¹⁴

Japan

The VMS operated by Japan has been largely developed in the framework of negotiation of access agreements and NAFO. Japanese tuna longliners that wish to undertake fishing in the EEZ of South Africa and Japanese high seas trawlers in the EEZ of the Russian Federation, are to obtain licenses from the Japanese government.²¹⁵ One of the license requirements is the installation of Argos equipment. While with regard to South Africa this simply conforms to South African regulations (see *infra*), with regard to the Russian Federation this is Japan's own initiative. No satellite-based VMS applies to the maritime zones of Japan.²¹⁶

Malaysia

An important regulatory tool in Malaysia's fisheries management is zoning. Accordingly, the zone within 5 nm of the coast is reserved for artisanal fishing vessels, although these are also allowed to fish further seaward. The zone between 5 and 12 nm is reserved for trawlers or purse seiners below 40 grt, between 12 and 30 nm (Zone C) for vessels between 40 and 70 grt and beyond 30 nm (Zone C2) for vessels above 70 grt. The vessels operating in Zones C and C2 have to comply with the fitting of ALCs which can work in conjunction with Inmarsat-C.²¹⁷ Transmitted data includes speed information and entry into and departure from designated ports (5 nm radius). VMS implementation was originally scheduled for three years, with fitting timed to coincide with the reissuing of fisheries licenses. Certain vessels are required to install ALCs ahead of schedule, *viz.* foreign owned or chartered (licensed

reciprocal agreements. See also R.R. Churchill, *The European Community and its Role in Some Issues of International Fisheries Law*, in: 'Developments in International Fisheries Law', E. Hey (ed.), Kluwer Law International, 1999, pp. 533-573, at pp. 565-568.

²¹² Authority is based on Art. 17 Fisheries Management Act (No. 38 of 15 May 1990) and Act No. 151 of 27 December 1996, which concerns Fisheries outside the Icelandic EEZ. Regs. No. 447/1999 and 6/2000 implement VMS obligations within the framework of NEAFC and NAFO respectively.

²¹³ It concerns certain vessels flagged in the EC, the Faroe Islands, Greenland, Norway and the Russian Federation.

²¹⁴ Based on *Icelandic Vessel Monitoring System for Fisheries Control and Surveillance*, prepared by the Directorate of Fisheries and the Icelandic Coast Guard, and information kindly provided by Mr. G. Kristmundsson, Directorate of Fisheries, January 2000.

²¹⁵ Japanese tuna longliners also used to have access to the Australian EEZ where they had to install Inmarsat-A (now C) equipment. Due to the impasse in the Commission for the Conservation of Southern Bluefin Tuna (CCSBT), Japanese vessels have for the last two years been refused access to the Australian EEZ.

²¹⁶ Information kindly provided by Mr. S. Nakatsuka, International Affairs Division, Fisheries Agency of Japan, May/June 1999.

²¹⁷ Authority is based on S. 9 Fisheries Act 1985 (Act No. 317, <http://agrolink.moa.my/dof>). ALC requirements are relatively stringent (see "Specifications of The Vessel Tracking Unit for the Vessel Tracking and Management System", at the website cited above).

vessels or domestic vessels convicted for fisheries violations. Currently around 20 vessels are tracked, including some domestic vessels. The total anticipated fleet size is 300-500 vessels.²¹⁸

Maldives

Foreign vessels operating in the maritime zones of Maldives are since 1995 required to carry ALCs (linked to Inmarsat-C), together with a system to monitor water temperatures.²¹⁹

New Zealand²²⁰

Pursuant to the Fisheries (Satellite Vessel Monitoring) Regulations 1993,²²¹ New Zealand makes the installation of ALCs mandatory for the following vessels:

- all foreign fishing vessels, including fish carriers;
- all foreign chartered vessels registered as New Zealand fishing vessels;
- all foreign unlicensed fishing vessels wishing to land their catch in New Zealand;
- all New Zealand fishing vessels over 28 metres;
- any New Zealand fishing vessel 28 metres or less which fish for orange roughy or scampi;²²²
- any New Zealand fishing vessel operating outside the New Zealand EEZ.

Norway²²³

Apart from Norway's participation in a number of RFMMs, it is also involved in satellite-based VMSs through various initiatives at the bilateral level. In May 1999 Norway agreed on a VMS Pilot Project with the EC, which would last from 1 July till 1 December 1999. A certain number of vessels from both Parties would be tracked while operating in the Norwegian EEZ and in the Community's waters. The Pilot Project is likely to lead to a bilateral compulsory satellite-based VMS as part of the bilateral agreement concerning fisheries for 2000 between Norway and the EC.²²⁴ A Pilot Project similar to that of Norway/EC was agreed on between Norway and Iceland in June 1999, and was scheduled to take place between 1 August and 31 December 1999. Also in June 1999, a similar Pilot Project was agreed on between Norway and the Russian Federation, and was scheduled to start in the autumn of 1999 and end on 31 December 1999.²²⁵ Norwegian vessels not covered under any of these bilateral agreements or RFMMs are currently not required to install ALCs, but this is expected to be just a matter of time.²²⁶

²¹⁸ Information partly based on comments kindly provided by Mr. J. Douglas, Absolute Communications Ltd., February 2000, and on Teo Siong Wan, *The Monitoring, Control and Surveillance in Malaysia*, FAO/Norway Government Co-Operative Programme, GCP/INT/648/NOR, Regional Workshop on Fisheries Monitoring, Control and Surveillance, Kuala Lumpur and Kuala Terengganu, Malaysia, 29 June – 3 July 1998, pp. 6, 8 and 9.

²¹⁹ G.V. Everett, *Some Observations on Fisheries Management Related to Monitoring, Control and Surveillance Issues in the Region of the Southwest Indian Ocean and Maldives*, in: '1996 Mauritius Workshop', *supra* note 11, at p. 51.

²²⁰ See also the references to New Zealand in notes 21, 61, 120, 154 and 155.

²²¹ Ref. 1993/354. Information confirmed by A. Bedford, Ministry of Fisheries, New Zealand, January 2000.

²²² See also the cooperation with Australia in relation to the 1998 STR Arrangement (*supra*, under Australia).

²²³ See also the references to Norway in note 133.

²²⁴ On 16 December 1999, Norway already enacted a Regulation relating to satellite-based monitoring of foreign vessels. On 28 January 2000 Norway and the EC adopted an agreement concerning practicalities on satellite tracking. Uniform implementation is expected to be effected by 1 July 2000.

²²⁵ Information kindly provided by Mr. T. Løbach (Norwegian Directorate of Fisheries), January 2000.

²²⁶ *Perspectives on the Development of the Norwegian Fishing Industry*, St. Meld No. 51 (1997-98), Norwegian Ministry of Fisheries, pp. 59-60.

Peru

The Peruvian VMS uses Argos and covers currently around 800 fishing vessels, but this could be enlarged with another 200 small vessels. The types of ships covered are purse seiners with more than 32.6 cubic metres storage capacity, trawlers and long liners. Domestic and foreign vessels licensed to operate in Peru's maritime zones are required to install ALCs and have them switched on, but in certain cases tracking could also extend beyond Peru's maritime zones.²²⁷ A strong emphasis in the compliance effort is placed on controlling that a zone of 5 nm adjacent to Peru's coast is reserved for artisanal fisheries. While the current focus is primarily on position verification, the transmitted information is also to be used to ascertain the status of stocks, e.g. through the transmission of catch reports and, in a second stage, by fitting a certain number of ships with sensors capable of measuring sea salinity and temperature.²²⁸

South Africa²²⁹

South Africa requires all foreign vessels licensed to fish in its EEZ to install ALCs, which they are to have switched on not only in the EEZ but within 400 nm from its coast.²³⁰ So far, Japanese licensed vessels have not honored the requirement to have the ALC switched on before entering the EEZ. ALCs will have to comply with certain minimum requirements, which are currently met only by Inmarsat-C and Argos.

As regards national vessels, the matter is less straightforward. At the moment only vessels fishing for patagonian toothfish in the EEZ around Marion Island are required to install ALCs. This is a direct result of regulatory activity within CCAMLR (see *infra*). Like Canada, South Africa pursues a phased-in approach, which could ultimately result in all national fishing vessels having to install ALCs, in particular those involved in industrial fisheries. In case of new or developing fisheries, for instance the pelagic longline fishery, license negotiations with the Marine and Coastal Management Directorate will certainly include the issue of ALCs. Also, following a request by the Marine and Coastal Management Directorate, many of the 70 trawlers engaged in the demersal fishery in the South African EEZ have agreed to install ALCs. In the near future, national vessels involved in high seas fisheries will also be required to install ALCs as one of the license-conditions.²³¹

United States²³²

²²⁷ Art. 4 of the most recent draft of the Regulations for a System of Satellite Tracking of National and Foreign Fishing Vessels (Satellite Tracking Regulations), to be adopted by Supreme Decree in 2000. General authority is based on Decree-Law No. 25977, containing the General Law on Fisheries, and Art. 6 Supreme Decree No. 008-97-PE, which provides for the implementation of a System of Satellite Control of fishing vessels. Supreme Decree No. 002-99-PE (will) list(s) in paras. (10) and (25)-(30) several types of behavior relevant to the Peruvian VMS, as administrative infractions. Foreign vessels predominantly fish for giant squid (with jigging machines). Although foreign purse seiners cannot in general operate in Peru's maritime zones, an exception is made for those fishing for tuna.

²²⁸ See also Title III which, *inter alia*, envisages use of VMS data by the Marine Institute of Peru and the Ministry of Defense. Information kindly supplied by Mr. L. Icochea, Facultad de Pesqueria, Universidad Nacional Agraria - La Molina, Peru, June 1999 and Ms. V. Rojas Montes, Ministry of Fisheries, January 2000.

²²⁹ See also the references to South Africa in notes 120, 141 and 154.

²³⁰ While the requirements on ALCs are included in licenses, the authority to issue fishing licenses subject to conditions is laid down in the 1998 Marine Living Resources Act (No. 18 of 27 May 1998, Government Gazette, No. 18930; text also available at: <http://www.gov.za/acts>). Ss. 18/23(1), 39(2) and 41(1) require licenses for local fishing by national vessels, foreign vessels and high seas fishing for national vessels respectively.

²³¹ Information kindly provided by R. Leslie, Sea Fisheries Research Institute, Department of Environmental Affairs and Tourism, South Africa, June 1999.

²³² See also the references to the United States in notes 59, 127, 140, 156, 169 and 170.

The United States began experimenting with a satellite-based VMS in the Hawaii region in 1995.²³³ Only vessels holding a Hawaii longline limited access permit are subject to the obligation to install a VMS unit (ALC). The regulatory approach of the Hawaii system is linked to closed areas. The other major fishery in which the United States operates a VMS is the Atlantic sea scallop fishery.²³⁴ The United States uses various service providers (Inmarsat, Boatracs and Argos) to track around 550 vessels with a future potential of another 1600 vessels. Although foreign vessels could in theory apply for an access permit, these have never been granted, mainly due to the absence of a surplus in TAC. Recently it has been decided to start a national scheme in which information will first be transmitted to Washington D.C. and then distributed to the relevant regions. The national scheme is currently in the drafting stage.²³⁵

The fact that prohibition of fishing in closed areas is not subject to criminal proceedings but to civil/administrative proceedings, has important implications for the standard of proof. Rather than the 'reasonable doubt' which would be required under criminal law, it will be sufficient to establish a certain 'preponderance of the evidence'. The primary evidence used for prosecution are the photograph and pilot observations, or the boarding crew report. The signature printout (navigation pattern of the vessel) might in the future be used as further evidence of fishing, or conclusive evidence of location. In the Hawaii region about three cases are prosecuted each year, but as a settlement is reached each time, they are not taken to Court.²³⁶

6.3 Regional Fisheries Management Mechanisms (RFMMs)

CCAMLR (Commission for the Conservation of Antarctic Marine Living Resources)

The XVIIth meeting of CCAMLR adopted Conservation Measure 148/XVII, entitled 'Automated Satellite-Linked Vessel Monitoring Systems (VMS)', which requires Contracting States²³⁷ to install ALCs on board of its fishing vessels "which are licensed in accordance with Conservation Measure 119/XVII, to harvest marine living resources in the Convention Area, and for which catch limits, fishing seasons or area restrictions have been set by Conservation Measures adopted by the Commission".²³⁸ The system, which does not apply to vessels engaged only in krill fisheries, should be operative from 1 March 1999 onwards, but in any case not later than 31 December 2000. At the XVIIIth Meeting of CCAMLR, October/November 1999, several States suggested that there was no rationale for exempting krill vessels from the VMS requirement, but consensus to change Conservation Measure 148/XVII accordingly could not be reached.²³⁹

²³³ The Hawaii system is governed by Ss. 660.22 (r-y) and 660.25 *Code of Federal Regulations*, Chapter 50, based on the Magnuson Act.

²³⁴ See 50 *Code of Federal Regulations* 648.9. Carriage of ALCs in the Northwest Hawaiian Islands crustacean fisheries is voluntary (Hitchen and Yin 1999, *supra* note 16, at Section 5.1). The number of vessels tracked in the Northeast Groundfish fishery and the Alaska Atka Mackerel fishery is quite small. The number of Taiwanese vessels referred to in note 140 is 24.

²³⁵ See Hitchen and Yin 1999, *supra* note 16. In Section 5.3 and 5.4 they note that VMS is being implemented in the high migratory stocks fisheries in the Southeast (September 1999) and Northeast (particularly northern bluefin tuna).

²³⁶ Information kindly obtained from Mr. P. Ortiz (NOAA), 1999.

²³⁷ The following States have ratified the CCAMLR Convention (*supra* note 26) and are Members of CCAMLR are: Argentina, Australia, Belgium, Brazil, Chile, EC, France, Germany, India, Italy, Japan, Korea (ROC), New Zealand, Norway, Poland, the Russian Federation, South Africa, Spain, Sweden, Ukraine, the United Kingdom, the United States and Uruguay. Currently there are also 6 Acceding States, i.e. States that have ratified the Convention, but are not Members of CCAMLR. These are: Bulgaria, Canada, Finland, Greece, the Netherlands and Peru (<http://www.ccamlr.org>).

²³⁸ Para. (1). The text of Conservation Measures is available at <http://www.ccamlr.org>.

²³⁹ See CCAMLR-XVIII/25, paras. 3.13-3.24 (Report of the Standing Committee on Observation and Inspection (SCOI); also attached as Annex 5 to CCAMLR-XVIII). The current state of implementation of Cons. Meas.

FFA (South Pacific Forum Fisheries Agency)

One of the key objectives of the FFA is to promote intra-regional coordination and cooperation in fisheries surveillance and enforcement.²⁴⁰ In November 1997, the Forum Fisheries Committee (FFC)²⁴¹ approved requirements governing the FFA VMS which have now been incorporated into the Harmonized Minimum Terms and Conditions for Foreign Fishing Vessel Access (MTCs). The key aspects of the FFA VMS include:

- any foreign fishing vessel that wishes to apply for a license to fish in the maritime zones²⁴² of a FFA Member State must first be registered on the VMS Register of Foreign Fishing Vessels maintained by the FFA. This VMS registration procedure complements procedural requirements which have to be met in order to obtain licenses from FFA Member States,²⁴³
- foreign fishing vessels shall not be permitted to fish in the maritime zones of FFA Member States unless the vessels are licensed in accordance with the Common Regional Fisheries Licence Form;
- all foreign fishing vessels licensed to fish in the maritime zones of Member States are to install ALCs approved by the FFA and operated in accordance with the FFA VMS Guidelines.²⁴⁴

While the FFA has no formal powers to ensure the implementation of the FFA VMS in FFA Member States, pursuant to the FFC's adoption of the FFA VMS, the Member States are held to implement the VMS requirements in national legislation. The FFC "retains the primary responsibility for providing general policy and administrative guidance for the operation of the VMS Register".²⁴⁵ Moreover, although none of the requirements just listed mentions that domestic vessels are to be subjected to the same conditions, several FFA Member States are already requiring this.²⁴⁶

Currently, all FFA Member States have enacted legislation to implement the FFA VMS, or are in process of doing so. These enactments, which are largely similar in content,²⁴⁷ cover common issues such as ALC-related conditions and penalties for non-compliance. More specifically, provision is also made for the coastal State's claim of ownership to all VMS data generated in its maritime zones and the confidentiality of VMS data, including circumstances in which such information can be released. The rate of implementation of the VMS by FFA Member States differs; largely according to the type and nature of foreign fishing activities in each Member State's maritime zones. Some Member States (e.g.

²⁴⁰ 148/XVII is set out in CCAMLR-XVIII, para. 2.15.
²⁴⁰ Art. V(2)(c) South Pacific Forum Fisheries Agency (FFA) Convention (10 July 1978. In force 9 August 1979). Currently there are 16 Member States to the FFA Convention: Australia, Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, Vanuatu and Western Samoa (<http://www.ffa.int>). Among the successful fisheries enforcement initiatives developed by the FFA are the Regional Register of Foreign Fishing Vessels, the MTCs (see *infra* in main text) and the negotiation of the Treaty on Cooperation in Fisheries Surveillance and Law Enforcement in the South Pacific Region (Niue, May 1992. In force 10 May 1993).

²⁴¹ The FFC is the governing body for the FFA (see Art. V FFA Convention).

²⁴² While certain FFA Member States limit access by foreign vessels to the EEZ, others also include the territorial sea and/or archipelagic waters.

²⁴³ Information obtained from the FFA Homepage at <http://www.ffa.int> and the FFA VMS Guidelines (see *infra* in main text).

²⁴⁴ Vessel Monitoring System Guidelines for Installation and Registration of Automatic Location Communicators. The FFA VMS Guidelines are specified in the MTCs.

²⁴⁵ Art. 1.1 of the Procedure for the Operation of the VMS Register of Foreign Fishing Vessels (Annex 4 to the MTCs, as amended by FFC34 (24-28 November 1997)).

²⁴⁶ Australia, New Zealand, the Solomon Islands and (probably) Papua New Guinea.

²⁴⁷ With the exception of New Zealand and Australia which have their own VMS regulatory framework in addition to their commitment to the FFA VMS.

Solomon Islands and Papua New Guinea) have fully implemented the VMS requirements and have declined to license foreign fishing vessels that do not comply with the ALC conditions. At the time of writing, 87 foreign fishing vessels have been registered on the VMS Register. This number is expected to climb to about one thousand when the VMS is fully operational.²⁴⁸

ICCAT (International Commission for the Conservation of Atlantic Tunas)

On 21 December 1995, at its Fourteenth Regular Meeting, ICCAT adopted a Resolution on Vessel Monitoring which encourages flag States to use satellite tracking. At the 1997 Meeting, ICCAT adopted a 'Vessel Monitoring System Pilot Program' which came into effect on 13 July 1998. Essentially it recommends Contracting Parties²⁴⁹ to adopt a pilot program on a satellite-based VMS for ten percent of certain types of vessels flying their flags and fishing for ICCAT species on the high seas outside the fisheries jurisdiction of any coastal State. The three-year pilot program will be effective on 1 January 1999, except for vessels fishing in the Mediterranean which will be effective on 1 January 2000. ICCAT shall evaluate the pilot program at its 2002 meeting.

NAFO (Northwest Atlantic Fisheries Organization)

In the follow-up to the *Estai* incident and the adoption of the 1995 Fish Stocks Agreement, NAFO adopted a 'Pilot Project for Observers and Satellite Tracking'. At the 20th Annual meeting of NAFO in September 1998, the Fisheries Commission adopted a new Part VI to the NAFO Conservation and Enforcement Measures, entitled 'Program for Observers and Satellite Tracking'.²⁵⁰ Under this program, NAFO Contracting Parties²⁵¹ are to require all vessels flying their flags that fish, or plan to fish, in the NAFO Regulatory Area to be equipped with satellite tracking devices as soon as possible and not later than 1 January 2001.²⁵²

NEAFC (North-East Atlantic Fisheries Commission)

The NEAFC adopted a Recommendation on a Scheme of Control and Enforcement in respect of Fishing Vessels Fishing in Areas beyond the Limits of National Fisheries Jurisdiction in the Convention Area (NEAFC Scheme). Article 9 on Vessel Monitoring System provides that each NEAFC Contracting Party²⁵³ shall implement no later than 1 January 2000, a VMS by *inter alia* ensuring that FMCs shall be operational and that satellite

²⁴⁸ Information provided by FFA Secretariat.

²⁴⁹ Currently there are 26 Contracting Parties to the ICCAT Convention (International Convention for the Conservation of Atlantic Tunas, Rio de Janeiro, 14 May 1966. In force 21 March 1969, *United Nations Legislative Series UN/LEG/SER.B/16*, pp. 483-491): Angola, Brazil, Canada, Cape Verde, China (PRC), Equatorial Guinea, France, Gabon, Ghana, Guinea, Italy, Ivory Coast, Japan, Korea (ROC), Libya, Morocco, Panama, Portugal, the Russian Federation, Sao Tome and Principe, South Africa, Spain, the United Kingdom, the United States, Uruguay and Venezuela (<http://www.iccat.es>).

²⁵⁰ Supplement to the basic NAFO/FC Doc. 98/1 (serial No. N2976).

²⁵¹ Currently there are 17 Contracting Parties to the NAFO Convention (Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries, Ottawa, 24 October 1978. In force 1 January 1979) Bulgaria, Canada, Cuba, Denmark (in respect of the Faroe Islands & Greenland), Estonia, EC, France (in respect of St. Pierre et Miquelon), Iceland, Japan, Korea (ROC), Latvia, Lithuania, Norway, Poland, Romania, the Russian Federation and the United States (<http://www.nafo.ca>).

²⁵² Introduction to Part VI. Information kindly obtained from Mr. H. Koster, Chef d'Unité Inspection, European Commission.

²⁵³ Currently there are 6 Contracting Parties to the NEAFC Convention (Convention on Future Multilateral Cooperation in the North-East Atlantic Fisheries, 18 November 1980. In force 17 March 1982, <http://www.neafc.org>): Denmark (in respect of the Faroe Islands & Greenland), EC, Iceland, Norway, Poland and the Russian Federation.

tracking devices are installed on board of fishing vessels.²⁵⁴ Attachment V to the NEAFC Scheme contains specific measures on the secure and confidential treatment of VMS information, which could set an example for other RFMMs.

Central Bering Sea

The 1994 Central Bering Sea Convention²⁵⁵ requires in Article XI(3)(a) that Contracting Parties²⁵⁶ shall require their fishing vessels that fish for pollock in the Convention Area to use real-time satellite position-fixing transmitters while in the Bering Sea.²⁵⁷ Currently, the six Contracting Parties have agreed to a moratorium on pollock fishing in the Central Bering Sea. Nevertheless, each Contracting Party is allowed to authorize two vessels to conduct 'test' fishing in the Central Bering Sea. These vessels are required to carry ALCs. As soon as the moratorium is lifted, all fishing vessels that operate in the Bering Sea have to meet this requirement.²⁵⁸

6.4 Conclusions

The State practice examined above reveals a considerable number of States which already operate a satellite-based VMS either as part of their obligations within the framework of RFMMs or independent therefrom. The most prominent distinction in these regulatory initiatives is naturally that between flag, port and coastal State approaches.²⁵⁹ Which approach, or combination of approaches, is pursued by a State depends on a wide range of circumstances, including not only a State's participation in RFMMs but more generally the type of considerations discussed in Section 3.2. Another noticeable difference in regulatory approach is that between a regime where the need for a satellite-based VMS is assessed for each fishery individually, and a regime where VMS is imposed more generally on all fishing vessels or those above a certain size.²⁶⁰

A further observation is the lack of uniformity and compatibility which is largely caused by a State's freedom of choice in system providers and ALCs. In light of the non-compatibility of VMS technology this is admittedly difficult to avoid. The more flexible attitudes of RFMMs towards the choice of system providers can be explained by the fact that the RFMMs play only a facilitating role, whereas the actual operation of the VMS is carried out by its participants. While RFMMs are not likely to be charged with a true enforcement role, it is not imaginative that their roles might be enlarged with a clearing-house function,²⁶¹ which will increase pressure on participants to maintain high levels of compliance.

²⁵⁴ See also Annex VI.

²⁵⁵ Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea, Washington, 16 June 1994. In force 8 December 1995, 34 *International Legal Materials* 67 (1995).

²⁵⁶ These are: China (PRC), Japan, Poland, South Korea (ROK), the Russian Federation and the United States.

²⁵⁷ See also Art. XI(4)(a) which stipulates that Parties shall exchange VMS data "on a real-time basis through bilateral channels".

²⁵⁸ The Monitoring, Control and Surveillance Group established minimum standards and specifications for VMS equipment in 1995, but these do not indicate a preference for a specific system. Information kindly provided by Ms. S. Auer (NOAA), January 2000.

²⁵⁹ See note 185 for a comment on port State approaches.

²⁶⁰ Most of the States examined in Section 6.2, except the EC, fall in the first category, whereas the second category would appear more pertinent to the EC and the group of RFMMs. Of course, this could be merely the VMS' evolutionary stage or the fact that a RFMM manages fisheries which lend themselves more easily to a more general VMS approach.

²⁶¹ Which is presently already performed by the FFA (which is not a 'real' RFMM; *supra* note 183). Some flag States appear to be unhappy with such a clearing-house function. For example, Japan has consistently opposed a centralized VMS by FFA Member States. Recently, Japan has indicated that it is developing its own VMS and is encouraging FFA Member States to use it (information provided by FFA Secretariat, February 2000). This initiative certainly has to be seen in the context of the ongoing VMS debate in the CWPFO-process (*supra* note 184).

7 Conclusions

Satellite-based vessel monitoring systems (VMSs) are but one example of applied modern technology which have the potential for profoundly changing fisheries management in the immediate future. The availability of near real-time information on fishing activities within enormous ocean surfaces opens up almost unimagined management options, particularly for those concerned with data gathering and ensuring compliance. The recognition of this potential is reflected in the rapidly expanding use by States, regional fisheries management mechanisms (RFMMs) and ship operators alike. Ongoing developments indicate that the obligatory use of automatic location communicators (ALCs) as part of a VMS is likely to be applied in all major industrial fisheries within the next few years.²⁶²

This article purports to identify some of the main policy and legal considerations which States and RFMMs should take into account when developing satellite-based VMSs for fisheries management.²⁶³ From a policy perspective it is firstly essential that the principal limitations are fully understood: (a) vessels not equipped with ALCs, or whose ALCs are not functioning properly, cannot be located. Complementary means of surveillance will therefore always be necessary. Satellite remote sensing (SRS) is one option although it is not yet operational at either the national or the regional level; (b) traditional means of surveillance by sea or air will generally be required to bring or order offenders to port and thus ensure prosecution; and (c) a satellite-based VMS is most effective in conjunction with management based on measures such as closed areas, exclusion zones, closed seasons or restricted fishing days. Secondly, it is critical that thorough assessment ascertains that a satellite-based VMS is in fact the most cost-effective compared to other means of data gathering and monitoring, control and surveillance (MCS). Thirdly, crucial to the success of the system is the way in which it guarantees the confidentiality and security of the information transmitted to the management authority. Insufficient emphasis on this aspect is bound to have severe repercussions for cooperation and compliance.

A more general policy aspect is the observation that satellite-based VMSs will in many situations be the most cost-effective if applied on a regional basis. Although State practice reflects a growing number of States that use satellite-tracking either independently or through a RFMM, global coverage has by no means been achieved yet. In this situation, the existence of non-compatible VMS technology and a wide range of policy options, calls for global strategies and harmonization.

In addition to policy considerations, a fisheries management authority will have to accept that the scope of application of its satellite-based VMS will have to comply with applicable rules of international law. The ensuing restrictions are particularly apparent if it takes a coastal or port State approach, as defined in Section 4.1. Rather than exercising jurisdiction over ships that bear their own nationality, which Section 4.1 categorizes under flag States, jurisdiction exercised by coastal and port States relates to foreign vessels that engage in certain activities in the coastal State's maritime zones or even beyond. The main conclusions which can be derived from the complex analysis are:

- foreign vessels that wish to engage in fishing, fish processing or fish transshipments in a coastal State's maritime zones can be required to install ALCs;
- foreign fishing vessels with fishing licenses cannot be required to have the ALC switched on for a considerable time in advance of entering the coastal State's maritime zones, or after departure therefrom. The flag State may of course require

²⁶² FAO Doc. COFI/97/INF.6 (*supra* note 42), p. 2.

²⁶³ Account should also be taken of the various technical difficulties in ensuring that a VMS functions satisfactorily.

its vessels to have the ALC switched on continuously and thereby alleviate the coastal State's concerns. Likewise, RFMMs may impose such a requirement on ships operating in the high seas adjacent to a coastal State's maritime zones;

- foreign vessels without fishing licenses cannot be asked to install ALCs or to have them switched on if they merely exercise rights of navigation in a coastal State's maritime zones. Arguably, it would not necessarily amount to an abuse of rights to require such vessels to install ALCs as a condition for entry into port. However, as port States would not have a basis of jurisdiction to require such ships to have the ALC switched on prior to entry into port, this previous requirement appears useless;
- the situation with regard to foreign fishing support vessels that engage in bunkering of fishing vessels in EEZs might be the most controversial. The resolution of this conflict in use will depend on classifying bunkering as freedom of navigation or an use associated therewith under Article 58(1) LOSC and the extent of coastal State jurisdiction under Article 62(4) LOSC. In the end, the matter may have to be treated as a residual right under Article 59 LOSC and necessitate resolution by a body like the International Tribunal for the Law of the Sea (ITLOS), even though the ITLOS did not resolve the issue in the *Saiga (Merits)* Case.

All four of these conclusions relate to the way in which the law of the sea, as laid down in the LOSC and occasionally elaborated by the recently adopted global instruments relevant to fisheries management, defines the distribution of jurisdiction between flag States on the one hand and coastal and port States on the other. States and RFMMs are held to respect this jurisdictional balance and to abstain from unilateral exercises of extra-territorial jurisdiction if this would be inconsistent with the *pacta tertiis* principle. Nevertheless, various indications exist that States and RFMMs are probing the limits of international law, in particular with regard to port State jurisdiction. The fact that the use of satellite-based VMSs and ALCs is likely to have spread widely in the near future will certainly be in their advantage.